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THE TEACHER SPEAKS

NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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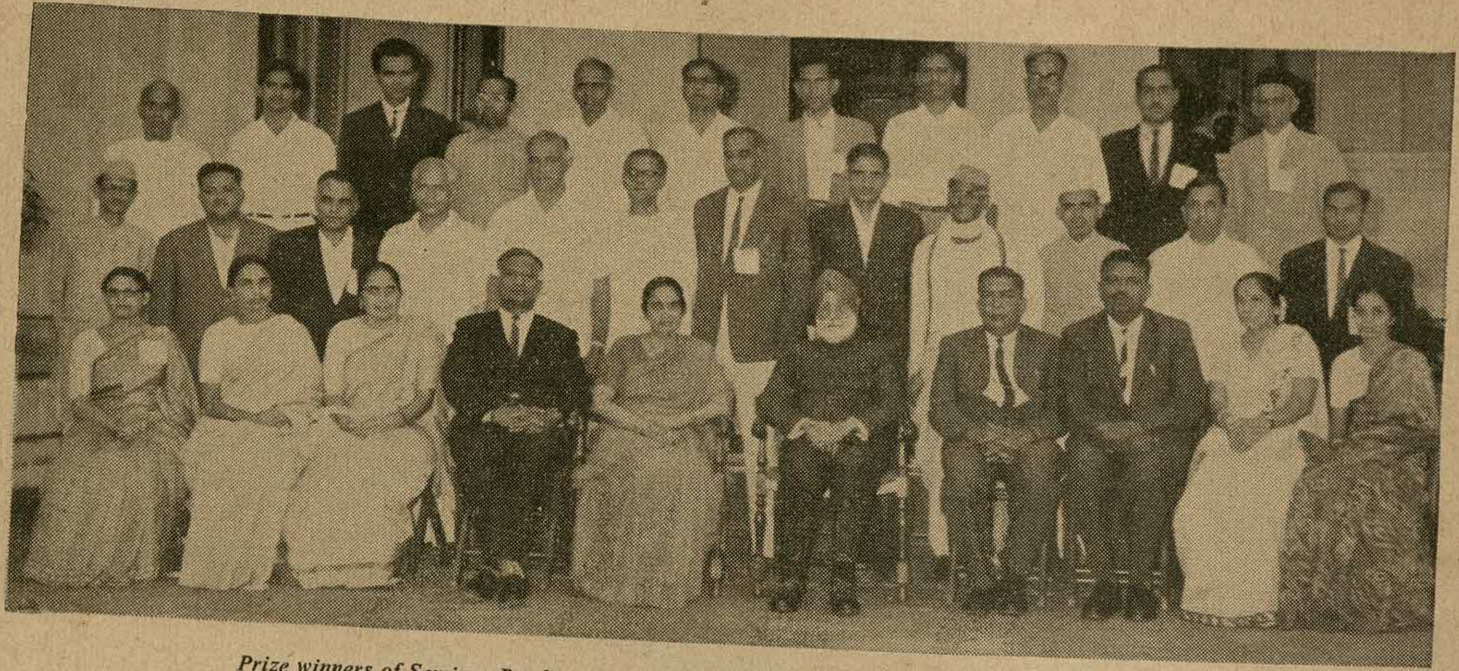
THE TEACHER SPEAKS

Volume 5



Prize winners of Seminar Readings with the Governor of Madras, NCERT officials and officers of the Department of Education, Madras

THE TEACHER SPEAKS

VOLUME FIVE

DEPARTMENT OF FIELD SERVICES
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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Foreword

THIS is the fifth volume in the series *The Teacher Speaks*. As usual, it contains twenty essays selected from a large number of essays written by school teachers in the national contest called "Seminar Readings" organized by the NCERT. These essays were chosen by a group of judges and represent the best essays written by those teachers who participated in the contest. The thoughtful mind of our teachers is reflected in these essays. The teachers tell us through this medium what they think can be done in our schools to improve the quality of education. This is a mirror which not only reflects the mind of the teacher but also throws light on the salient tasks of teaching and learning as they have appeared to our teachers. We will not find here the unionized voice of the collective ; it is the individual who speaks, like Zarathustra.

There are many personal and social problems of our teachers—problems which need sympathetic understanding and which cannot be solved without dispassionate study of the intricate relationships which obtain between school education and economic and social development of the nation. But the essays in this volume do not discuss these problems. Here we truly find our teachers at their best, for here they speak as individual teachers speaking to a community of educators on educational problems of the school. Their thoughts arise out of their experiences in school which really make these essays a valuable gift to the entire teaching community. These are being published in the hope that all those who care to listen to the voice of the teachers will read these with interest and profit.

I am grateful to all teachers who participated in the contest. I am thankful to the extension centres, training colleges and the administrators who have helped my colleagues in the Department of Field Services in conducting the Programme of Seminar Readings.

SHIB K. MITRA
Joint Director
National Council of Educational
Research and Training

New Delhi,
September 17, 1968

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1

Education for International Understanding

D. S. Luktuke

EDUCATIONISTS are now agreed that one of the chief objectives of education should be the formation of a new attitude in school-going children, conducive to world peace. Thanks to the foresight of the Honorary Director of the Maharashtra Vidyalaya, and his urge to carry out various useful experiments in education, this project was undertaken in this high school four years ago.

The project is based on the following convictions

1. Our children must know what is happening in a world that is fast changing.

2. New nations are appearing on the world map. New ideas about the social, political and educational order are emerging. Our pupils must be conversant with them, so that they may prepare themselves for facing the future and solving its problems.

3. The development in science and technology has made us dependent upon one another.

4. So long as narrow national interests dominate and one holds into a firm conviction about the unquestionable superiority of one's own particular traditions and ways of life, it will not be possible to eradicate war and bring about peace.

5. Even though the possibility of abolishing wars altogether may be remote, this need not prevent the formation of a brotherly attitude towards other people. This will be possible if our pupils know the "How and Why" of the particular behaviour and attitude of other nations, and if a sense of service to humanity and tolerance is developed.

6. It is always advantageous to understand ourselves before trying to understand others.

7. Differences in the world should be a source of enrichment rather than a cause of conflict.

With these convictions we started the project. The following description may be looked upon as a practical approach to International Understanding rather than a formal "essay" on it.

The programme

It was decided that all nations—developed, developing and newly emerging—should be studied, because no nation can isolate itself from others in future. The work was progressively distributed over five years from 1963 to 1967, as follows :

1. Pupils of Std. VIII : Indian States.
2. Pupils of Std. IX : Asia, Africa, South America and Australia.
3. Pupils of Std. X : Europe, North America and the dependencies of Imperial Powers.

The aspects which were to be studied and features to be noted :

Aspects and features

1. Literature
2. Influence of great men on the National Character.
3. Religion.
4. Development in Science and Technology.
5. Political system.
6. Life and occupation of the people.
7. Educational programme.
8. Culture, Art, Music, Festivals, etc.

Procedure outline

1. Each class was to be divided into groups of three or four pupils.
2. Each group was to collect information on one selected aspect.
3. Pictures, postage stamps, coins, national flags, gramophone records of national anthems, etc., were to be collected to form a museum.
4. Each class was to write a manuscript dissertation on the country by arranging the information and data thus collected.
5. Selected pupils were to give a talk to the General Assembly of students.
6. At the end of the year or at suitable times, an International Week was to be observed by the school.
7. Visits to different schools were to be arranged to study local conditions.

Sources of Information

1. Reference books, such as encyclopaedias.
2. Correspondence with
    - (*a*) Cultural organizations, representatives of other countries in India and different schools in those nations
    - (*b*) Consulates of various nations
    - (*c*) UN and UNESCO agencies
    - (*d*) Periodicals published by various nations.

For the purpose of correspondence, the following points were suggested :

- (*a*) Personal as well as family information from pen-friends.
- (*b*) Information about the schools they are attending.
- (*c*) Extra-curricular activities, hobbies, etc.
- (*d*) Social Life (Festivals, Rites and Rituals, Special Problems, etc).
- (*e*) General information about the National Flag, National Anthem, Leaders, Scientists, etc.

3. Talks of visitors from other nations and interviews with them whenever possible.
4. Radio broadcasts of different nations.

Time

In the school time-table one period of social and cultural activities every week was allotted for this purpose. During this period, the plan of work was discnssed, a review of the work done was made and guidance for future work was given. Other related work was done during the leisure time of pupils as an extra-curricular activity.

Achievement

We began the work in June 1963. During the last four years our pupils collected information and material on 20 foreign countries, on all the States in India, on India as a whole and on the UN and its specialized agencies.

The name of the country and the number of manucsript dissertations written on it are given below.

Sl. No.	*Nation or State*	*No. of Mss*
1.	United Nations	4
2.	Russia	19
3.	United States	8
4.	Africa	4
5.	Japan	5
6.	Australia	4
7.	South America	1
8.	Germany	4
9.	Burma	4
10.	New Zealand	1
11.	Egypt	1
12.	Korea	1
13.	Great Britain	1
14.	Sweden	1
15.	Viet-Nam	1
16.	Indonesia	1
17.	Ceylon	1
18.	East Pakistan	1
19.	West Pakistan	1
20.	Tibet	1
21.	Nepal, Bhutan & Sikkim	1
22.	India as a whole	8
23.	Maharashtra	7
24.	Gujarat	4
25.	Kashmir	2
26.	Rajasthan	2
27.	Bihar	1
28.	Uttar Pradesh	1
29.	Punjab	1
30.	Madhya Pradesh	1
31.	Kerala	1
32.	Mysore	1
33.	Andhra Pradesh	1
34.	Madras	1
35.	Assam	1
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Collection of information, material, etc.

(*a*) We have, in our library, a fairly good number of periodicals published by UN and other nations.

(*b*) We are in correspondence with :

(*i*) Oakwood Collegiate Institute of Toronto (Ontario), Canada.

(The final year students of this institute have sent us different kinds of material about Canada).

(*ii*) Similarly, Kalevan Yhteishkoulu of Tampere, Finland, has sent us picture cards, books, postal stamps, writings of pupils about their hobbies, etc., and other material, and

(*iii*) The Principal of Alexandra School, Dublin, Ireland, has mailed us a kit on Ireland.

We held an exhibition of this material for the benefit of the school and guardians and other interested persons.

The name of our institution is registered on the mailing list of Radio Japan, Radio Bucharest, West and East Germany and Radio Netherlands. Much useful information is obtained from their programmes.

Exchange programme for students

A batch of ten students under the guidance of a teacher spent about ten days in Ahmedabad with a view to getting first-hand information and a personal experience of Gujarat's culture and way of life. This study-visit was arranged through the cooperation of Mrs. Freny Desai of Gujarat Law Society who had made the arrangements for the lodging and boarding of this group with families in Ahmedabad.

In order to clarify the purpose of this visit and enhance its educational potential we had arranged an orientation programme for this batch. It consisted of lessons in Gujarati so as to have a working knowledge of it, and lectures on the culture of the State and relations between our two States.

Evaluation

The success or failure of the project could be judged by the change in the attitude and outlook of the students as revealed through their manuscript dissertations. Below are given extracts from some of the manuscripts.

1. A student writing on Great Britain says: "Who, in India, is not aware of the tyranny and the cruel deeds of the British rulers? Our blood boils when we think of the days of our slavery. But we must not be led away by sentiment alone, specially when it involves feelings of hatred. Instead of looking at the cruelty of the British rulers we must pause and consider their qualities on the strength of which they ruled over us for more than a century-and-a-half. It is necessary, therefore, for us to study the way of their life, and how they developed such qualities".

2. A student writing on Germany admires the educational system of that country. He says: "It develops the habit of self-study, independent thinking, training in leadership, understanding of collective responsibility, regard for other peoples' views and love for one's own nation".

3. A student writing on Africa expresses his pride that "Though thousands of Indians had migrated to different parts of Africa they never tried to establish their rule in these parts as some western nations did".

These passages, chosen from the students' manuscripts show that those working on this project have definitely acquired a bent of mind in the desired direction and a broadend outlook.

4. The reaction of the students who participated in the exchange programme with Gujarat was very heartening. They could feel the warmth and affection of the families with whom they stayed; they compared their own behaviour in the school with that of the students in schools of Ahmedabad and they saw that there was ample room for their own improvement. They returned from Ahmedabad with a determination to improve the condition of their own school. In their opinion, this activity should become an integral part of the educational programme of their school.

These students were emotionally moved by the warm welcome that was accorded to them by students and their parents, teachers and professors, chancellor and ministers, all alike. There was one remarkable occasion they will never forget. Ten brotherless girls of Mohinaba Kanya Vidyalaya, Ahmedabad, affectionatley tied sacred *Rakhis* on the wrists of ten visiting students. The atmosphere charged with emotion was very touching. It was more expressive than a hundred lectures. Everybody present was moved and also convinced that these ties would last for ever. Here was genuine emotional integration. These students are sure to pass on this lasting influence to the other students in the school, when they share their experiences with them.

Influence of this project on the attitude of teachers

Participating teachers gained more confidence in such type of work. One teacher puts it thus:

"To send our students and teachers to different parts of our country and reciprocally to receive from other States such student-groups at our school, must become a regular feature of our school".

Those teachers who could not participate actively in this project desired that a special tour of teachers should be arranged to study the bordering States and neighbouring countries like Ceylon, Burma and Afghanistan.

Outline of future work

What we have achieved is not far below our expectations. Its significance lies in the encouragement that it has given and the confidence it has created in our students and teachers to undertake similar projects with an even greater degree of effort.

Some suggestions to those who would like to undertake this type of project

It may not be out of place here if a workable programme for any school intending to launch upon such project, is indicated. The essence of this project lies in (1) forming the attitude, and (2) widening the vision of students by supplying them with information about other States and nations in all possible ways.

Various school activities can be utilized with advantage for this purpose as indicated below.

A. Co-curricular activities

1. A wall-newspaper would prove to be a useful activity. A big map of the world should be painted on a wall. Important news items from the daily newspaper should be written on the wall board, indicating the place where the events occurred.

2. From among such news items, topics like food scarcity, railway or aeroplane accidents, sabotage or fighting, could be discussed in social study classes, where it is possible to appeal to the sense of humanity of the children.

3. Science does not belong to any one nation ; nor do natural calamities. Disease can affect any nation. Volcanic eruptions or earthquakes and cyclones do not consider whether their victims are capitalists or communists. Scientists who work to fight such natural calamities belong not to any one nation but to the human race as a whole. This aspact could be emphasized in science lessons.

4. A topic-wise study of geography and the study of natural regions of the world will give an ample opportunity to understand the similarities and differences between the various peoples living in similar georaphical conditions.

5. Art classes could be a very good medium to convey information about different cultures. The exchanges of children's paintings of various kinds, between different schools, could be encouraged.

6. Students could be asked to write compositions on topics like different festivals, *e.g.*, Moharrum, Ganeshotsav, Durgapuja, Makarsankrant, Vijayadashami, etc , such illustrated material could be exchanged with other schools.

B. Extra-curricular activities

1. School prayers and festivals observed by the school are useful in promoting understanding of our national heritage and of the way of life of other people.

2. Stories of noble deeds from various countries and States also can help the formation of proper attitudes. Better if such stories are included in the language textbooks.

3. Wherever possible (this may be possible in cities and large towns), members of different communities could be invited to attend the cultural programmes offered by the school children.

Annual social gathering, Founder's Day or Foundation Day of the school, Festivals like Ganeshotsav, Durgapuja, Makarsankrant, etc., are such days when these programmes could be arranged.

Special activities

1. UN and its specialized agencies in the scientific field have undertaken work on problems like :

(1) Indian Ocean Expedition.
(2) Study of the earth's crust.
(3) Study of Meteorology.
(4) World Water Supply.
(5) Space Research Work, etc.

Scientists of many nations, even those with conflicting political ideologies, are participating in such co-operative work.

Study of these activities will help the students to understand how the world as a whole is subjected to the common natural calamities and that the remedy lies in the cooperative efforts of all to fight them effectively.

2. A study of UN and its specilized agencies in the social and cultural field and the work done by them for India and other developing nations deserve more attention in social study classes. Thus it will be seen that teachers, practically of every subject, can participate in this project; and even within the existing educational programmes much can be done to promote international understanding. The activities mentioned in our project could also be tried with some degree of success even within the limits of local conditions.

2

On Teaching of Mathematics and Science

P. V. Jagannadha Rao

IN THE FOLLOWING PAGES I give an account of some of the class room situations I came across and their impact on my mind.

The deterioration of standards in mathematics is a serious problem which should be disturbing to all those who are concerned with teaching. The general aptitude for the subject is found to decline as the students go up the ladder of education. What are the reasons for this decline ? Can we be passive observers of it ? There cannot be two opinions regarding the importance of mathematics. It is the most important tool for all branches of the natural sciences as well as the social sciences. With the almost universal tendency towards research and the statistical approach to solving the problems, the importance of mathematics increases at every step.

In Class I or II, when the child learns the simple process of addition like $2 + 2 = 4$, he feels elated and tries to repeat the same in different situations. He thinks that he has made a discovery and insists on its being recongnized, as such. But unfortunately as he grows, the joy is lost and an aversion is developed towards the subject. The reason is that the subject is being taught mechanically without any life in the approach, with greater emphasis on rote memory than on understanding the relationships between the different operations. Students memorize the problems and their answers. In order to find out what is happening, I once tried a new method while setting the question paper. I changed the numerals in the later half of a problem without changing the wording and the numerals in the first half of the problem as in the printed book we had been following. Only 10 per cent of the students could solve the problem correctly and in the case of 60 per cent it was found that they had reproduced the complete solution of the problem given in the book. A second example, this one in geometry, is a matter of common experience. A number of students get by heart the proof of the theorems and while reproducing them they fail to coordinate the names in the diagram and the names used in the proof. This clearly indicates that the boys simply memorize the proof. Recently, I observed an interesting case in this connection. There is a problem in Hall and Stevens' Geometry which is considered important by mathematics teachers and hence it is asked generally in the examinations. The problem is "to prove that the angle subtended by the bisectors of the base angles of a triangle ABC is equal to $90 + A/2$". The teacher changed the problem by substituting the words vertical angle instead of $A/2$. The students failed to recognize what had to be done and no student answered the problem. Such instances are numerous. But the point to be realized and understood here is that the teaching of mathematics is far from satisfactory and it requires immediate improvement so that it can be used as a basic tool of learning. Another factor I observed is that the students feel fatigued by the tedious mathematical operations and thus they lose their interest and aptitude not only in mathematics but also in allied subjects like physics, chemistry, etc.

An analysis of the situation shows that the students are not properly motivated. We tend to be either too formal or too concrete without establishing the relationships. While teaching mathematics or any other subject, the stress should be on teaching processes and concepts of how the things are related. To talk in pedagogical terms, we must stress the structure of the subject. If the student is able to develop this aspect of learning he will feel elated by being able to solve new problems that come in his way and he will have the joy of discovery. He will not only learn the facts but learn the process of how to learn.

To illustrate this matter of learning the structure, we may take a few examples. Let us consider the example of the two algebraic formulae taught generally at the Class VIII level and repeated in Class IX.

$$(a+b)^2 = a^2 + 2ab + b^2$$
$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

These two are taught in complete isolation and the students do not find any relation or orderlines in them. Instead, these formulae can be taught by the inductive process, so as to make the students perceive the relationship in them and the orderliness they exhibit. For example, the following relations can be shown by multiplication.

$$(a+b)^2 = a^2+2ab + b^2$$
$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 +b^3$$
$$(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 +b^4$$
$$(a+b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$$

The teacher can make the student realize the symmerty in the expansion, the discending order of the powers of *a* and the ascending powers of *b* and the relationship of the coefficients to the powers. Thus without naming it to the class we can teach the Binomial Theorem before reaching XI grade or the college level. Now a student will be in a position to do the expansion of any power, because he understands the structure of the process. This approach is bound to be opposed by the traditionalists on the ground that the child at class VIII level, *i.e.*, 13 +, is not mentally mature to recognize and understand this relationship. I do not agree. I feel that there is no difference in the nature of the thinking process of a child who starts learning and an expert in the field. The only difference lies in the degree. According to Bruner "Any subject can be taught effectively in some intellectually honest form to any child at any stage of development". I personally agree with this hypothesis. The problem with us is not whether the child can understand the subject or not, but how to teach the child, in what is called an intellectually honest form. The subject matter has to be so presented as to enable the child to recognize the orderliness and the relationships that exist in different aspects. The teacher is an important factor here. Teaching of structure means going deep into the subject. This means that the teacher must have a great depth of knowledge in the subject concerned ; he should not be shallow in his field. At present we have a good number of teachers who are shallow in their subject and hence the problems. They fail to create any interest or curiosity among the children in the subject matter and its application. They fail to present the subject matter in the required intellectually honest form to the child to suit his stage of development.

Another factor which supports this hypothesis is that a subject can be learned in a better manner if the pupil is placed in a situation in which a specialist works. Then the pupil feels the joy of discovery and recognises the orderliness which motivates his interest for further learning, which becomes a chain reaction. Thus the child learns the process of learning, not merely some disconnected facts. It is possible that some people may have the apprehension that the teaching of structure is more suitable to the intelligent section of the class and detrimental to the progress of the average and below-average students. I feel that the teaching of structure is more helpful to the average and below-average students. Now they need not memorize the innumerable facts. Instead, they have to learn the relationship that exists in them and develop the ideas of commutation and association. It is easier to remember how the facts are related than to remember mere facts.

While teaching physics to Class IX, I found that the students tried to avoid the numerical problems because of tedious mathematical operations like finding square roots or cube roots, etc. This inhibits the progress in physics. In order to develop curiosity I started teaching logarithms for solving problems. According to the syllabus, it comes under mathematics at Class XI stage. But I wished to do this experiment. The details of the procedure adopted are given below. Different opinions were expressed on the wisdom of teaching logarithms to Class IX. I am happy to state that these criticisms helped me to study the subject in some depth and evolve a method of approach which is comprehensible to the level of the class.

In the beginning I started with the regularity and relation of the numerical system we are using with 10. I taught them how to express every number with a single integer, *i.e.*, to have units only like $10=1\times10^1$, $100=1\times10^2$, $1000=1\times10^3$, etc., and then $349=3.49\times10^2$, $34.9=3.49\times10^1$, etc. Then they were given the concept of negative power and what it means. They were taught $10^{-1}=1/10=0.1$, $10^{-2}=1/10^2=0.01$, $10^{-3}=1/10^3=0.001$. This was followed by a practice of representing the decimal quantities in terms of single integers as $0.349=3.49\times10^{-1}$ etc. At this stage a question was raised by a student how to represent the figure 1 in terms of powers of 10. Of course we know the answer to be 10^0. Instead of telling them the answer they were made to derive the same by showing that $1=10/10$ which can be rewritten as $10^1\times10^{-1}=10^0$. From this they made the discovery of the general relation that $a^0=1$. From this illustration the boys were able to understand that the numbers are not independent and disconnected, but have a regular relation to the base 10 and they found that the total number of digits in a number is the top limit of the power of the base 10. Hence they were able to write any number as 10 overlimit+something. At this stage they were given the definition of logarithm which is nothing but this power of 10. After giving sufficient drill in determining the lower limit of the power of the base 10 which was named the characteristic, the boys were informed about the mantissa and how it is related to the order of the numbers present. They were given the practice of finding out the mantissa and thus the logarithm of a number and then they were taught the anti-logarithms and how to find them. After these exercises the boys were taught and given practice in the simple operations of multiplication, division and finding the powers of any number.

In finding out the logarithm of fractions, the combination of positive mantissa and negative characteristic was avoided. The boys were asked to represent every number to have an integer, as *e.g.*, 0.349 as 3.49×10^{-1} and then find the logarithm. This helped to avoid the confusion of negative characteristic and positive mantissa. The procedure is appreciated by more than 50 per cent of the students and they started using logarithms in solving not only physics problems but also chemistry and mathematics problems. They found great relief in using logarithms in solving problems on compound interest. I should like to thank my colleagues for giving support to this project.

I should like to mention another situation which is concerned with chemistry. I always feel depressed when teachers of chemistry say that it is a subject to be memorized rather than understood. Is this a fact ? Don't we find any regularity or system in chemistry ? Is chemistry a science or not ? If there is any system or regularity in chemistry why should we delay to teach it till the college level ? Can't we find a suitable method or approach to present chemistry as a systematic subject at the school level ? We come across students memorizing the fact that hydrogen combines with oxygen to form water and treat it as an isolated fact. This is an obvious example of how the students fail to learn the relationship and the causes of chemical reactions. If instead of teaching the detailed properties of different substances, we teach the causes of chemical reactions and the conditions under which they take place, and how they take place, in other words, if we teach the structure of chemistry, the inquisitiveness and curiosity of the students towards the subject increase and they will realize what chemistry is and what science is.

In teaching the properties of alkylhalides, say ethyliodide, the common practice adopted is to state the reactions with different reagents as isolated facts. The students then try to memorize them.

We can adopt a different procedure. After all, the chemical reactions are nothing but breaking of existing bonds in a compound and forming new bonds. Let us take up the case of ethyliodide. In ethyliodide there are one Carbon-to-Carbon Bond, Five Carbon-to-Hydrogen Bonds and one Carbon-to-Iodine Bond. Of all these the Carbon-to-Iodine Bond is the weakest and hence whenever ethyliodide takes part in a chemical reaction this bond breaks first. A chemical reaction always tends to take place in the direction in which there is a decrease in potential energy. Hence the breaking of the Carbon-Iodine bond is justified and we get the free radical 'the ethyl.' This ethyl radical reacts with the counterpart in the other reagent and forms a new bond and hence a new compound. Thus we see that when ethyliodide reacts with aqueous KOH it forms Ethylalcohol and with KHS it forms Ethylmercaptain. Chemically there is no difference in the reactions. They are similar. Even at the school level if the student is taught that there is chemical bounding energy and how it effects the chemical reactions, the student will be in a position to understand the structure of the subject and can predict the properties. Thus he can have the feeling of discovery, and the joy it brings.

One can go on giving any number of examples to represent the sad situations in class-room teaching. In the previous pages I mentioned some of the situations I came across during my 17 years of teaching and some of the methods adopted to bring new life into teaching and arousing the curiosity of children. I do not claim that they are the only methods nor the best methods. But I strongly appeal to all those concerned with secondary education to think deeply on the ssues presented and evolve a procedure that can be effectively followed in our schools to save future generations. The teaching of the structure is an essential factor. I suggest that research on these aspects should be undertaken immediately under the guidance of experts in the subject matter and in the field of education. Secondly, some schools should be selected for these activities in the first instance as experimental schools. These schools should be spread out in the country and should not be concentrated at selected places. A thorough revision of the textbooks should be made. It is our responsibility to provide better education to our children. It is said that "Every generation has the responsibility to provide better education to their children." We have the advantage of the experience of previous generations.

Another important factor which requires primary consideration is the reorientation of teachers so that they teach mathematics and science as not mere collection of facts. In the words of Morris H. Shamos "Perhaps the greatest injustice that can be done to Science is to regard it merely as a collection of facts and the practice of Science as little more than routine accumulation of minutes. Facts alone do not constitute a Science". I feel that Summer Institutes are not sufficient to fill the vacuum. Science cannot advance of its own accord. It should have a number of young people imbued with the spirit of Science, trained in its methods and aware of its function in a culture. Hence an adequte programme of reorientation with proper follow-up work is an essential feature to have any progress in the field of Science Teaching.

3

Vocational Guidance for Girls in Secondary Schools

Nirmala Gopal Kirane

UMA, A STUDENT of Standard X was playing on the ground. While playing, she had a fall. She was wounded near the eye. I went to the ground and gave her the necessary first-aid. Then I sent for a doctor. On the advice of the doctor, we took her to the hospital. Her mother was also sent for. The doctor examined and said, "The wound will have to be stitched. I must administer her anaesthesia." But Uma said, "No doctor, don't operate me under anaesthesia. You can stitch my wound without it." The doctor was amazed to hear it. He asked, "Why do you say so ?" She said, I wish to be a doctor. So I must be brave. I should not be afraid of such small things." I told Uma's mother, "We must help her to fulfil her wish." I convinced the mother that she could improve in her studies. Whenever she meets me, the mark on her forehead reminds me of the incident.

Clever Jyoti stood first in Class X. But because of her orthodox grand-parents she was married early. We tried to get them to agree to educate her but in vain. Jyoti could not fulfil her wish. But her younger sister Vimla got a chance. It was the result of our efforts. We hope to see her listed in the first 30 at the coming S.S.C. Examination.

Saroj, without thinking properly, selected physics and chemistry and got only 45 per cent marks in the S.S.C. Examination. She joined the science course with great enthusiasm, against my advice. Saroj failed in the first year science twice. At last she joined Arts. Had she accepted my suggestion, she could have saved money and labour and frustration too.

Indra Asrani's case was similar. We suggested to her to take social studies as she was weak in mathematics. But her mother forced her to take mathematics. She worked very hard but could not pass the terminal examination. She had to offer social studies at the Preliminary Examination. But it was too late. She failed in the S.S.C. because earlier she had spent her energies working very hard on mathematics, prior to the preliminary examination. She was in need of a job but because of her failure she was disappointed.

Usha Bhat's father wanted her to be a medical practitioner. I had arranged to test her I.Q. when she was in Class X. I suggested to her the Arts course, but instead, she offered science subjects. She passed with 40 per cent marks. Though her financial condition was very sound, her I.Q. forced her to join the Arts course. This example clearly shows that I.Q. is one of the important factors while deciding the career of a student.

All these illustrations go to prove that educational and vocational guidance for girls in Secondary Schools is very essential. Neither the girls nor their parents know anything about choosing careers. The rising cost of living has compelled everyone to take up a job. Here vocational guidance comes to our help. For these reasons, the value and importance of vocational guidance has become very significant.

What is vocational guidance ?

Vocational guidance means guiding the students to select proper careers and vocations. It is necessary to make them acquainted with the essential qualities required for the different types of careers and vocations ; to help them in order that they acquire efficiency in the career they have undertaken. This is the work of a counsellor. All-sided individual development is the aim of education in a democratic society. While achieving the aim, we must see that society also flourishes. For this reason, the students should get proper guidance. This work is to be done by the School Counsellors.

Speedy industrialization of our country and the opening of many useful and worthwhile avenues demand the introduction of vocational guidance.

Meena joined engineering. She was clever and rich. She could complete the course easily. Her parents arranged for her marriage with an industrialist. After her marriage she was unable to work as an engineer. Meanwhile the chance of admission of a boy-student in the engineering college was lost because of her. This sort of wastage must be stopped.

After S.S.C. Examination, Bina wanted to join the Ayurvedic medical course. She did not offer Sanskrit at the S.S.C. She was, therefore, not admitted into that college. This happened as she was not given proper guidance at the right time.

The following table will show the general trends among girl students in a secondary school in Bombay.

Year	*No. of Passes*	*Science*	*Arts*	*Sewing*	*Drawing*	*Other*	*Home*
1963	31	14	6	1	—	—	10
1964	44	9	12	—	2	—	21
1965	45	13	19	—	—	—	13
1966	55	16	20	3	1	—	15

From the above table we conclude that most of the girls prefer to join either the Arts or Science course. In reality there are various courses open to the girls but the students and parents do not know anything about them. A Counsellor must, therefore, give an idea of these courses to the girls.

Sometimes the girls select the careers far above their intellectual level. So after some days they have to leave them. By appropriate guidance such a wastage could be stopped. Many girls join music, drawing, journalism, sports, etc. They hear the fame of many a worthy person in this field. They think that they could also get fame in a short time. But they fail to understand that one has to work very hard to get mastery in any field. They only build castles in the air. In the end they are disappointed. All this happens for want of guidance.

The individual's bent of mind and innate qualities help us in judging an individual's vocational aptitude. The Institute of Industrial Psychology, London, has arrived at a scheme after research for many years. This scheme has laid down seven directives.

Important directives

(1) A student's health should be suitable for the career.
(2) A student should be educationally qualified.
(3) A student should undergo an I.Q. test.
(4) A student should be skilled in the career.
(5) A student should have interest in the career.
(6) A student must have a natural leaning towards the vocation to be taken, *e.g.*, a hot-tempered girl would not be a good nurse, and a nervous boy will not bacome a good canvasser.
(7) A student should choose a career according to his or her socioeconomic conditions.

To make Vocational Guidance successful and effective, the entire school atmosphere should be congenial to the guidance programme.

Requisite qualities of a school counsellor

A School Counsellor should be social and modest. He must have a thorough knowledge of different vocations and courses. He must be well acquainted with the administration of intelligence tests. With the help of charts, books, booklets, lectures, film-strips, career exhibitions, radio and career conferences, he must try to make the 'guidance' a success. A Counsellor must know the psychology of the students. He must also be familiar with their family problems and other difficulties. He should think over their individual problems and guide them sympathetically. The Counsellor is the link between the parents and the Guidance Centre.

Follow-up work makes it clear whether the guidance programme is progressing in the right direction or not. The follow-up acts like a barometer. A Counsellor should note down the educational and vocational progress of a girl under his or her care. He/She should see him/her often, guide and help him/her in solving his/her difficulties. The follow-up work would detect the mistakes, if any, in the guidance programme, thus helping her to choose the vocation best suited to her.

Vocational guidance in India is still in its infancy. Follow-up work will help us to remove the deficiencies.

There are 3,500 secondary schools in Maharashtra. Nine hundred Career Masters, 66 School Counsellors and 55 part-time Counsellors are working in this State. Only 10 teachers are able to take the Diploma from the Guidance Bureau every year. If this is the pace of progress in Maharashtra what would be the state of affairs in other States !

Courses best suited to the natural and innate qualities of girls are few in number and they are not properly planned. Only two universities, one in Maharashtra, *viz.*, S.N.D.T. Women's University and the other in Gujarat, *viz.*, Maharaja Sayajirao University, have done something useful in this direction.

Social customs, family traditions, economic set-up, the physique and the mental aptitude alone, do not decide an individual's vocation. Besides the individual's likes and dislikes, wrong notions about vocations have also to be taken into account.

A woman is mostly dependent on her counterpart. We should not base our judgments only on girls residing in cities and towns. So we should not chalk out the programme of guidance only for such girls. There are hundreds of girls who are poor and live in villages. Our curriculum is not framed according to the needs of such poor students. The government and the society should see that there is a provision for a special curriculum for girls to enable them to achieve their all-sided development. It is the duty of the government to give them a fair opportunity to shape their careers according to their innate talents.

Let us review the different vocations now open to women and the requisite qualities thereof.

Useful careers for women

The medical course, the courses in midwifery, health visiting, nursing, etc., need the following qualities : Good health, a silent and inquisitive nature, power of keen observation, free thinking and a sweet tongue. The doctor's personality should be impressive and she should be sympathetic and attractive.

A woman can take up teaching as a career. There are different stages of education : pre-primary, primary, secondary and university. A woman can be a teacher of music, craft and physical education. A sympathetic view towards the pupils' knowledge of a subject, fluency in speech (oratory in story telling) and an impartial nature make an individual a successful teacher.

After S.S.C. the girls can work as typists, clerks, stenographers and accountants. For this they should be punctual, neat and tidy in their work. They should be of a social nature and be ready to work hard.

A secretary, a receptionist, a booking clerk, an air hostess, a telephone operator, a tourist-guide and a governess are some other useful careers for women. In modern times a girl can become a successful hotel-manager also. For these careers a woman should have happy disposition, a sweet tongue and attractive manners. She must have a balanced mind. She should be able to deal with any problem. She should have the capacity to take quick and correct decisions on any problem.

The modern age gives more opportunities to a woman than in the past. She can be an insurance agent, a sales girl or a commission agent. She needs an impressive personality and modest behaviour for these careers. Habit of hardwork and alertness of mind are essential traits for these vocations.

Women are progressing in the different arts. They are becoming good dancers, singers, actresses, radio artists and painters. Sound health, liking for words and an impressive personality are desirable for these professions.

Women can become journalists also. For this they need independent views, good general knowledge and good reading habits. Women can be successful in running hotels, stationery shops and toy shops.

For this they should possess aesthetic sense, cleanliness and a hardworking nature. They should be able to deal with the customers sympathetically yet judiciously. The women who wishes to do social work can take up the Labour Welfare Officer's job, Juvenile Delinquency Officer's job and Begger Home Superintendent's post ; she can also work as a Medical or Social Representative. This way she can earn a living as well as do some social service Women who essentially love humanity can do this well. If they are inclined to religion or philosophy, so much the better. She must know human nature. She should work with a smile on her face.

The women who are interested in science can do research work in the university. They should have command over their subject. They must think logically and must have faith in the pursuit of truth. If a women wants to become a pleader she must have a clear-cut knowledge of law and must have also commanding personality. She also can go in for the course of veterinary surgeon. She can also become a homeguard or a police official. In order to join the police department she must have a sturdy body, love of discipline and straightforwardness.

A woman can be a librarian if she so desires. For this she must have an appetite for reading, neatness in work, punctuality and an inquisitive attitude.

In India very few students really get the benefit of vocational guidance. Lots of difficulties stand in the way of the implimentation of the guidance programmes. For promoting vocational guidance, care must be taken of many things of importance.

There should be a separate branch for girls' guidance, as they have special problems of their own—emotional, domestic and physical.

There should be a special officer in charge of this branch. Under his able guidance and supervision other guidance centres should be opened. A group of three to four schools should be formed and facilities for guidance should be made available group-wise ; well-equipped special rooms for this specific purpose must be maintained.

I distributed the questionnaires (Appendix 'A') in 25 different secondary schools in Greater Bombay ; of these I received 1000 forms from as many as 22 schools. I analysed the data under three heads :

Monthly Income (*Rs.*)	*Name of Group*
200	'A'
201 to 600	'B'
601 and above	'C'

Taking into consideration answers to the Question Nos. 12, 16, 19, 22 and 23, (Appendix 'B') I have come to the following conclusions.

The group 'A' (Income below Rs. 200 p.m.) shows that the girls from these families are in dire need of a job to help the family. The group 'C' (Income above Rs. 600) pupils show that they like to work to pass time usefully. Sixteen per cent girls from group 'A' show their desire to take up the career of a primary school teacher. The attractive scales of primary school teachers of the Bombay Municipal Corporation might be one of the reasons for this preference. 10.5 per cent of the girls from Group 'C' also wish to join this profession because of the large number of holidays and light work. If we take into account all the three groups, 22 per cent girls from 'A' group, 42 per cent from 'B' group and 24 per cent from 'C' group do not wish to join the teaching profession. The reason is clear that it has no status as it is considered to be a low-paid profession.

Important suggestions

Suggestions regarding vocational guidance for girls in secondary schools :

1. The girls should be given guidance in Std. VII and X.
2. The Connsellor should not thrust his or her own views on the girls but only guide them.
3. The Counsellor should take into account aptitudes, likes and dislikes, abilities and qualities of the students before coming to any conclusion and then suggest to them 2 or 3 alternative vocations.

4. The Counsellor should be sympathetic towards the pupils.
5. The management and the principal should cooperate to make the scheme a success.
6. Governmental and non-governmental Industries, Banks, Central and State Government Offices, Mill Owners' Associations, Small Scale Industries Associations, Heads of Universities, Managements of different educational institutions, the Employment Exchange Officers, the Principals and the Parents should all come together and co-operate with the Counsellor to get the best out of this scheme.
7. The programme of career guidance should be developed on the basis of the merits of the students and their individuality, artistic sense, aptitudes and their needs.
8. The citizens should not remain disgruntled.
9. Students should be given ample opportunities to take the best out of them by allowing them a wide choice to select the right vocation.
10. Care should be taken to check wastage and remove the causes of discontent.
11. Contacts among the institutions doing such work need to be established by organizing annual get-together meetings for the exchange of experiences, ideas, etc.
12. The Government should give all possible assistance to such institutions.
13. Establishment of multipurpose schools is the need of the day.
14. Under the present system of education a student is made to learn what she dislikes and she is prohibited from learning what she likes. For example a student having an aptitude for music and a definite dislike for mathematics is not allowed to learn music instead of mathematics up to the X Class. This should be seriously taken note of.
15. There should be district-wise centres to train career masters and full-time Counsellors.
16. By a recent Act of the State Government each industry has to provide for 12 per cent apprenticeships. The schools should let the guardians know about this. There should be a separate agency to choose students of proper abilities and aptitudes to the respective industries for apprenticeships.
17. Lectures by experts in different subjects should be arranged for the benefit of the students.
18. Secondary Education should have a vocational bias. For this we will have to make revolutionary changes in the system of education.
19. It is the duty of the men at the helm of affairs to take out the maximum from an individual to promote national output. The system of education must be vocation-centred and if we base it on the qualities of the students concerned then only the wide gap between education and practical realities can be narrowed to some extent.

Every individual should give the best to society and should take only that which is absolutely necessary for him. This is the principle of progress which will be beneficial for us. In order to bring this principle into practice, reorientation of secondary education on a vocational basis is the prime need of the day.

APPENDIX 'A'

Please Answer the Questions Correctly and Briefly

(*Your answers would be kept confidential*)

1. Your full name ....
   (Begin with surname)
2. Age .... Date of Birth..................................
3. Religion.................................... Mother Tongue..............................
4. Monthly income of the family ....
5. Name of the school ....
   ....
6. Medium of instruction ....
7. The total marks secured at the last exam..
8. Underline the programme of extra-curricular activities in which you have taken part :
   (1) Indoor Games
   (2) Outdoor Games
   (3) Elocution compitition
   (4) Music
   (5) The Name of the school
   (6) Dancing
   (7) A.C.C.
   (8) Girl Guiding
   (9) Social work
9. Please underline the hobby which you have :
   (1) Sewing
   (2) Knitting
   (3) Embriodery
   (4) Drawing
   (5) Reading
   (6) Gardening
   (7) Seeing dramas & pictures
   (8) Any other hobby (please mention)
10. Education of father............................Occupation..................................
11. Education of Mother............................Serving : Yes/No.
12. Do you wish to serve : Answer Yes/No
    If your answer to Q. No. 12 is 'Yes' then underline the reason below which applies to you most.
    (*a*) To help the family
    (*b*) To get economic independence
    (*c*) Liking of one particular line
    (*d*) To occupy in work
    (*e*) For further education
    (*f*) For the service of Humanity
    (*g*) To get the pleasures of life
    (*h*) On parents' advice
    (*i*) For proceeding to foreign lands
    (*j*) No specific reason
    (*k*) If any other reason, please write it.
13. Do you wish to continue the education after S.S.C. ? If your answer is 'Yes' then which course you wish to undertake ? Yes/No
14. Do your parents allow you to serve ? Yes/No
15. Will you start serving immediately after passing the S. S. C. Examination ? Yes/No

16. Write the two vocations you like to take up in order of preference.
17. Give reasons for your liking.
18. Do you desire to learn while you earn ? Yes/No
19. Which occupation you definitely dislike ? (write only one such occupation).
20. Which profession your parents desire you to take up ?
21. Do you like to stay in Town/Village ? Why ?
22. Have you ever discussed about your profession with your friends, relatives or teachers ?
    Yes/No ... With whom ? ... When ? ...
23. Is there any provision of Vocational Guidance in your School ? Yes/No
24. Are the periods of V.G. arranged in your regular T.T. ? Yes/No
25. Do you get the guidance even after the school hours ? Yes/No

APPENDIX 'B'

	Q. No. 12: Do you wish to serve? What is the reason for it?	*Q. No. 16: Vocations in order of preference*	*Q. No. 19: Vocation which you dislike*	*Q. No. 22: Vocational Guidance in school*	*Q. No. 23: Any Discussion about the vocatian*
Group 'A' Monthly income below Rs. 200/-	(1) Help to Family 46%	(1) Nursing 23%	(1) Teaching 23%	49%	50%
	(2) Economic Independence 15%	(2) Teaching 16%	(2) Nursing 10%		
Group 'B' Monthly income from Rs. 201-600	(1) Help to Family 28%	(1) Doctor 28%	(1) Teaching 42%	96%	64%
	(2) Liking 14%	(2) Serving 14%	(2) Nursing 10%		
Group 'C' Monthly income above Rs. 600	(1) Yes, liking 23%	(1) Doctor 23%	(1) Actress 23%	66%	57%
		(2) Teaching 10.5%	(2) Teaching 24%		

4

A Tried-out Method of Teaching English to Underachievers

K. Venkataramaiah

UNDERACHIEVEMNT IN English has become the characteristic feature of most of the students who come to the high school. If they are taught English on the assumption that they are normal achievers, the gap between the expected and the actual achievement widens as they move to higher standards and their craving for dictated notes increases. For them memorization is the only process of learning because they tend to treat language more as knowledge than as skill.

Two years ago the Department of Extension Services, R.V. Teachers' College, Bangalore, selected our school as one of the six schools for a programme of intensive work. They conducted a series of workshops for us. One of the very valuable lessons I learnt at these workshops was the importance of remedial teaching in English for the students that come to VIII Standard from the primary school. The co-ordinator sent us prepared test material for a diagnostic test to be administered to the VIII Standard students at the beginning of the school year. The oral and written answers given by 170 students of our school were assessed and analyzed. It was a very educative, though depressing experience.

The analysis of the answers showed that the students could not write or speak even one correct sentence in English. Their handwriting was very bad. Many of them did not know how to join some of the letters in words. They did not know the use of capitals. Their ability to understand the simplest English, either written or spoken, was very poor. They were innocent of word order or any other rule of sentence construction. This was the picture of their achievement after having learnt English for three years at the primary stage.

An analysis of the entries in their application forms showed that many of the students came from poor illiterate families. So all their learning was confined to whatever little they learnt in the classroom. They entirely depended on the teacher for learning the language skills.

I was given English work in one Kannada medium section of fifty students. I felt that it was useless to cover the syllabus in the normal way. I was convinced that without some remedial teaching all my efforts would be waste of time and energy. I discussed this problem frequently with my Headmaster. He gave me permission to do what I thought best. I had the good fortune to get the guidance of the Co-ordinator and the Director of the State Evaluation Unit. They suggested that the first few weeks could be used for remedial work. I took this suggestion and tried out a remedial method. This work was done for one period of 45 minutes every day for eight weeks. The total number of periods I got for this work was forty-five.

My most important objective. was to create interest and confidence in my students so that they may enjoy the learning process. I wanted them to learn the correct use of capitals, punctuation marks, the articles, the word order, the tense system and some fundamental structural patterns.

In the first period, I gave each student a sheet of paper and asked everyone to write as many English words as he knew. I suggested that they were free to write the names of all the things they saw in the classroom, in the school, on the road, in the house and any other place they could think of. They could write words that described shape, size and colour and the words which described daily actions. They were asked to write the words neatly and number each word. I collected the papers at the end of the period and tried to have an idea of their vocabulary. The maximum number of words written by one student was 104. Many students had written less than 50 words. I went through the English texts prescribed for V, VI and VII Standards to have some clear idea of what the students should have achieved.

The next four periods I engaged the students in word games. A list of 10 words such as—clean, part, sold, many and year—was written on the blackboard and the students were asked to write new words by omitting the first letter in each word on the blackboard. Then another list of 10 words such as—beside, outside, without, somewhere and something—was given and the students were asked to write as many short words as they could from each of the big words. Another list containing two sets of short words was given for combining to form big words. Another exercise was to make the students write two more words that end like—took, tall, will, came and fate. Then a set of 20 words was given to be arranged in alphabetical order and finding the number of syllables in each of them. That way they were guided step by step to write words opposite in meaning, similar in meaning and to make new words by adding a suffix and a prefix. At the end of every exercise the students were guided to evaluate themselves. They enjoyed this game and were a little thrilled at their achievement.

For two periods I engaged them in the game of classifying words by asking them to underline the stranger in each group of words such as: (1) good, bad, fine, did, weak; (2) Bangalore, Tumkur, Mysore, Bombay; (3) come, slowly, eat, play, laugh. This kind of exercise was used to help them to understand the different parts of speech.

At this stage I made every student keep a separate notebook for the English work. I made them learn a simple method of self assessment of their achievement at the end of every period.

The next two periods were used for spelling games. Stencilled sheets containing groups of jumbled letters were given and the students were asked to make words by rearranging the letters in each group. The meaning of the words to be formed was given in brackets. In another sheet a list of words was given for completion. The hard spots in each word were left blank. I gave every two students a dictionary to verify the spellings. I suggested that they must learn to write new words by seeing the letters carefully, and naming the letters. If they went wrong in spelling a word, they must rewrite the word and mark the hard spot in some interesting way.

Then I gave them each a stencilled sheet of twenty-five sentences such as : (1) A noun is a naming word ; (2) A chair is made of wood—and asked them to put the subjects into plural. First each student was made to answer orally one sentence. Then every student had to write down the answers for all the sentences in the notebook. Another exercise was given in which plural sentences had to be put into singular form. Another exercise was given for completion with articles. These exercises were used to help them to get some idea of the word order in statements and the use of articles.

Then I introduced the tense system through a series of exercises. A stencilled sheet containing 50 sentences with first person subject and the different forms of the verb 'be' formed the first exercise. The students were asked to change the subject into third person. Then they had to make the subject plural. First each student had to answer orally and then write the answers for all the sentences in the notebook. This was the method for every exercise in this series. At the end of every exercise the boys were guided through a discussion to discover the grammatical points. The next exercise introduced them to helping verbs. Then the verbs that describe the daily actions were introduced. Then changing of sentences from simple present to present continuous and then from simple past to past continuous was introduced. At this point participles and their use in changing the tense were explained. I confined myself to drilling these seven tense forms—simple present, present continuous, present perfect, simple past, past continuous, past perfect and simple future. While drilling the simple future the use of 'Shall and Will' was explained.

Then a few more exercises in changing statements to questions and negative questions by using 'do' and its forms were given. Then structures using 'It is' and 'There is' were introduced. Groups of jumbled words to be arranged to form correct sentences formed the next exercise. In answering these exercises the students were guided to learn the use of punctuation marks.

I had spent about 25 periods to arrive at this stage. Then I tried to make them learn to write correct sentences by asking them to describe in one sentence the work of each of the persons such as—"a postman, a policeman, a farmer, a carpenter and a pilot". Then I introduced twelve stories from *Aesop's Fables*—three every period. I gave the story in the form of jumbled statements and asked them to rewrite the statements in the proper order to form a story. They enjoyed this exercise. It enabled them to learn to comprehend the sequence of events. The frequent transcription enabled them to learn to write neatly and use capitals and punctuation marks correctly. Then I used three periods for making them translate three parables of Sri Ramakrishna into English. Translation as re-expression helped to correct some of the bad language habits. In Kannada often the verb is understood in sentences. Many students write English sentences without the verb. I was able to help them to correct this bad habit by making them discover the differences between the word order in Kannada sentences and English sentences. They were able to appreciate in their own simple way the peculiarities of two living languages. Translation done in the right way is as good as free composition in learning language skills.

Then I gave them six stories, each condensed to a page, such as *Ali Baba and Forty Thieves*, and *Ulysses and the One Eyed Giant*· After reading every story they had to answer ten simple questions each in a complete sentence. Many of them were

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able to comprehend the stories and answer the questions in fairly correct sentences.

For two periods I gave them two exercises in dictation to train them in listening carefully and to train them in the use of punctuation. I had to repeat three or four times the phrases and words.

Then I gave them some jokes in English to train them in understanding humour. I shall give just one example to illustrate the type of exercise. "One evening three friends who were deaf, were walking to the market. One of them said, 'It is windy'. The second friend said, 'No. It is not Wednesday. It is Thursday'. The third friend said 'Yes. I am also thirsty. Let us have some drink". I suggested that they could collect such jokes from back numbers of the *Illustrated Weekly* or some other source and share the jokes with their friends by writing them on the bulletin board.

For two periods, I gave them illustrated classics and magazines such as Finding out. They felt happy to see the pictures. Some of them tried to answer the Quiz in Finding out. Some of them read biographical sketches from the magazines and expressed the main points in Kannada. I tried to guide them in translating their expressions into simple English. Many of them got interested in reading simple English. I had taken about forty-five periods to come to this stage. It was easy for me to know that many of the students were improving every day in their language skills. Many of the students developed confidence in their ability to learn English. They had a sense of achievement in every period. From their progress I realized the truth of the statement that, "Nothing succeeds like success". But there were some slow learners who showed little improvement. Perhaps they were "non-liguistic" students and they needed special treatement which was beyond me. They seemed to have an aversion for learning the language skills.

After completing this remedial work I began my regular work. I started with the non-detailed text. One of them had four stories. I took three of them—'Dick Whittington', 'Beauty and Beast', and 'Jack and the Bean Stalk'. For each story I prepared a set of twenty-five jumbled statements representing the main ideas of the story. I gave every student a stencilled sheet of these statements and asked them to note down the number of the page and the paragraph that gave each of the ideas. This was tried as a group assignment. I divided the class into groups of five each. Many of the students earnestly took part in this group work and completed the three stories in six periods. I have made remedial work at every stage a part of my normal work. Teaching and evaluating, re-teaching and re-evaluating is very interesting work. The remedial work helped me to cover the syllabus quickly and I was able to complete the portions more effectively and purposefully.

Preparing the stencilled material for the graded exercises, was very difficult and laborious work. It involved much thinking, consultation and reference work. I got many ideas from books such as *Living English Structure* by W. Stannard Allen.

As long as we want to learn English we must learn it well without wasting our time and energy in futile controversies. As English is the language of Science and Technology, our progress in these important fields depends on our ability to use English to our advantage. The foundation for this ability must be laid strongly at the secondary stage. It is well known that English teaching is not effective at the primary stage. So remedial teaching in English at the beginning of the secondary stage is very important.

Remedial teaching must become a part of our regular work. It involves continuous evaluation at every step and also some action research to find out the causes for the deficiencies. This aspect of teaching has assumed great importance as education is spreading fast to rural areas. The children coming from villages do not get any learning experience in learning English apart from what they get in the classroom. Home assignments become a painful burden to them.

We have to devise work-books suited to our educational environment so that we may have a uniform standard of teaching and learning. Perhaps we have to devise special work-books for remedial work for underachievers and slow learners. I like to remind myself of the proverb "A stitch in time saves nine" to feel convinced that we have to make remedial teaching in English a part of our regular work to make our normal teaching purposeful.

5

The Traditional Syllabus and the Functional Teaching of Science in Secondary Schools

K. M. Sripada Rao

ANY INNOVATION in science teaching is often wrecked on the rock of a formalized syllabus, however carefully the syllabus may have been framed by experts in the field. This at any rate is the opinion of many a teacher of science and it cannot be disregarded either as superficial or as thoughtless. Many teachers feel that the syllabus sets the lines for the course of teaching by laying down the concepts or principles to be taught. The syllabus is supposed to be based on the average needs of the students and the time required for teaching, time as measured by the clock and not in terms of the time required by the students to learn. A closer examination of this view lands us in complexities and conflicts. In the first place the syllabus is not always constructed after scientifically determining what is the average need of students in respect of science. I shall restrict myself to what is termed as general science. It is very often called non-specialist science or science for the citizen. What should be the objectives in teaching such a generalized course? What should be the content of this course in terms of facts and principles to be taught? What attitudes and skills are to be developed in this course? In what respects should it be different from the elective courses in science? It is now agreed that in the general science course the main branches of science, *viz.*, physics, chemistry and biology should not be taught as separate subjects and it is also agreed that general science should be taught preferably by a single teacher. In what way should the topics in general science be correlated? What is the kind of integration aimed at in such a combination of physics, chemistry, biology? For we must note that correlation is the external aspect of the presentation of the subject-matter whereas integration of ideas is the mental aspect of such a correlated approach. I am afraid that the syllabus in science has not been examined in a scientific manner from these different points of view. Many defects can be cited in the syllabus.

The textbooks are not of much assistance in amplifying the syllabus because the textbook writer toes the line of the syllabus, carefully balancing the subject-matter so that it may not be far above the indications in the syllabus or far below it. He is controlled by extraneous factors such as the number of pages in his textbook and the cost of printing.

In a broad sense no syllabus can be regarded as complete in itself or as determining the teaching in all its details. It is always to be considered as a structure helping us to reach our educational aims, and as a structure it requires to be filled in detail. It must be constantly subjected to examination to find out whether it is in consonance with our present state of knowledge and whether it can help us to fly intellectually through the universe and have a vision of its vastness and magnificance and at the same time pass like elves into the bodies of living and non-living things to see the patterns and changes in their microcosms, in short, to understand the world around us intellectually and imaginatively. I have always considered the syllabus as a means to an end, and instrument in the achievement of goals. It is like a musical instrument and the music we get out of it depends upon the skill of the artist. In this sense the syllabus does not inhibit our teaching. For it provides us with only an outline of the units and topics under each unit, which should be regarded as the minimum subject-matter to be conveyed to students. I have always felt that I am free to give a concrete shape to the syllabus though not to alter it. Here are some of the ways in which I have dealt with the syllabus to suit my teaching of science.

1. Rearranging the topics in the best manner possible to bring about correlation.
2. Correcting the errors in terminology or classification, etc.
3. Designing experiments to illustrate facts and principles. These are experiments not contemplated under the syllabus but which I have felt are very essential for the elucidation of the scientific concepts.
4. Strengthening the subject-matter by the addition of discoveries and ideas in view of recent investigations.
5. Clarifying the topics which have been vaguely stated in the syllabus.
6. Lastly, organizing the topic or topics in such a manner as to constitute a project so that it may be received with the best possible motivation and executed in a process of active learning. Very often this action programme leads the teacher and the pupils beyond the four walls of the classroom into dynamic teaching and learning processes with new visions and vistas, with new insights and understandings, the whole process providing the thrill of new experiences to the pupils in the field of science.

I shall describe some of the modifications I have attempted in the syllabus in order to project it into an action programme.

'Digestion of food in man' is invariably a topic in the general science syllabus of the secondary schools. Pupils have some knowledge of the process of digestion and digestive organs at the primary school level. They know the terms starch, sugar, proteins, fats and they also know that these are broken down in the process of digestion. I had always a feeling that the pupils learnt these names only by rote and they did not have a true and objective idea of these terms. I felt that I should explore with my students into the meaning of these terms. While searching for good reference books my eyes fell upon a book of bio-chemistry which was elementary in nature but at the same time highly useful for my purpose. I copied down with all avidity the structural formulas and the molecular patterns of glucose, maltose, sucrose, starch, proteins and fats. I wrote their patterns in charts and the students painted them with appealing colours. I entered my next class in general science very triumphantly with this new teaching material. The constituents of food were not empty terms but I could display their structure in a pictorial manner so that the students could grasp the patterns in their composition. After discussing their patterns, we thought of making models of these molecules. We used only coloured beads and wire for making the models. Though they were rough they were useful as devices in the learning process. The climax of the situation was reached in the next lesson which started with the question "What is Digestion?" It was quite easy now to explain that it was a process of breaking down of the complex molecules. But how are they broken down? This led to the chemical explanation of the process of digestion, *viz.*, hydrolysis and the action of enzymes. The students followed with rapt attention the explanation of the breaking down of the complex molecules by the addition of ions from water molecules. There was a short discussion on enzymes as bio-catalysts. The action of the enzymes was demonstrated by experiments showing the effect of saliva on starch followed by simple tests for the detection of starch and sugar.

I have found it very useful to provide a short test of the new type after the completion of a unit. This test helps me in the revision of the unit so that I may suitably stress the weak points in the students' learning and it also helps the students in consolidating what they have learnt. I was struck with surprise when I found that the students had understood the hydrolytic theory of digestion and this was a class of what we term as 'very average students' of the IX Standard having the mother tongue as their medium of instruction.

Another programme of this kind which the students carried out with enthusiasm was the study of bacteria. It started with an attempt to see bacteria under the microscope. Efforts to grow bacteria in stale bread, tomato and cooked rice were not successful because of the development of other microbes in the media. I thought of bacteria in the soil. I took a sample of garden soil in a petridish and mixed it with some flour and left it for two days. On the third day there was frothing, which was a sign of microbial activity. I could see a large number of bacteria under the microscope. This was a culture that would serve our purpose.

A number of questions arose when the students set up their own culture and examined it.

What is the structure of a bacterium? What is the size of the bacteria? What is the unit used for measuring their size? How can the size be determined? What is the technique for counting the number of bacteria? How do they obtain food? How do they reproduce? What is the magnifying power of the microscope? Which microscope provides the highest magnification? This incidentally led to the study of microscopes. One student took up the topic and wrote a paper on the compound microscope and the electron microscope. He read the paper in the class. When the magnifying power of an electron microscope was being discussed, one of the students mentioned the report he had read in a science journal on a field-ion-microscope. This gave the highest magnification, which is more than a million times. This was a revealing information to the class. The next day he brought the journal and described the source of magnification in the field-ion-microscope and displayed to the class a photograph of the atoms in the tip of a tungsten needle of 6-5 millionth of a cm. in radius examined under the field-ion-microscope. In the meanwhile batches of students observed the growth of bacteria and wrote reports of their shapes, size, number, etc. Graphs were drawn to show the rhythm of rise and fall in the number of bacteria. It was found that the soil bacteria greatly diminished in number after a period of profuse multiplication. The effect of sunlight, common salt and disinfectants on bacteria was incidentally observed under the microscope, because bacteria had to be killed before they could be counted in the microscopic field. Many charts showing the shapes, structure and division of bacteria were drawn. Models of bacteria were made.

This study of bacteria was followed by discussions on useful and harmful bacteria and bacterial diseases.

I feel that such clusters of activities are necessary to fulfil the major objectives of science teaching, *viz.*, the development of a scientific attitude, critical thinking and the spirit of rational inquiry. I am tempted here to borrow an analogy given in a book of science teaching and state that an educational objective is like the major military objective, *i.e.*, the general goal to win the war. But this general objective resolves itself into particularized or specific objectives such as capturing a fort here, encircling a troop there, blasting the ammunition collected by the enemy, cutting off the supplies, etc. The various activities conducted by the students have the general objectives in a peruasive manner while these specific objectives direct the details of procedure.

In carrying out these activities in the school time has not been a determining factor because I have allowed the students to work with the laboratory equipment outside the school hours and given them the earliest possible time to execute their programme. A set of enthusiastic volunteers was selected in the class to carry out each programme, and another set to draft the report on observations while a third set was occupied in making charts and models. The remaining students took part in a general manner in these programmes. All the available reference books were kept ready on my table for the students to make use of and to take home for intensive study. But the reading of the reports and the discussion of the reports, in short, the main development of the lesson, was done always in the classroom.

The advantages of this kind of functional approach in teaching science are many. To mention some of them :

1. Teaching becomes dynamic.
2. Students learn through activities and develop skills.
3. Teaching is not authoritative but it is exploratory or investigative and fosters critical thinking and scientific attitude.
4. Topics are correlated in a natural manner, *i.e.*, there is a fusion of chemistry, physics and biology in a dynamic programme.
5. The treatment of the topic rises to higher standards.
6. The students themselves prepare some of the teaching aids with the assistance of the teacher.

I believe the two-dimensional aspect of science teaching is served by this kind of enrichment of the topics in the syllabus. The two dimensions are :

1. Assimilation of essential information and understanding of the fundamental underlying principles.

2. Getting into the spirit of science by learning the scientific methods and skills.

For me the most valuable effect of this kind of activity-centered teaching is the freedom it gives from the conventional teaching of facts of science in general and abstract terms with the students as passive listeners. It breaks the bars of the syllabus tearing asunder the specious logic and orderliness of the syllabus in order to organize knowledge about a problem which is not arbitrarily chosen by the teacher but arises naturally in the minds of the students in the preliminary presentation of a unit. It is a problem which is the nucleus of interest for the students round which ideas or concepts organize themselves in an effective process of learning.

This may be compared with the traditional teaching of science in the classroom in which the teacher delivers his monologue punctuating it with the question "Did you understand?" to which the students desultarily reply "yes", whereas actually they are listless, some of them looking out through the window or yawning or enjoying day dreams.

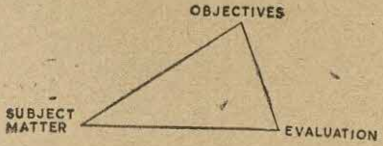
I have given this short account of the humble beginning I have made in the functional approach to the teaching of science which I believe yields the best results in the educational field. This method may be augmented by visits to factories, workshops, laboratories, lectures by experts and film shows.

6

An Experiment on Objective Based Teaching and its Evaluation in General Science in Standard VIII (One Group Method)

H. A. Trivedi

AFTER ATTENDING two workshops in Evaluation at the State and the Central level, I decided to try out the evaluation approach in the teaching of General Science in Class VIII E, keeping in view the fundamental objectives and their specifications.



As I started the experiment in November 1960, I divided the remaining syllabus into three units :

(1) Agricultural Unit
(2) Physiology and Hygiene Unit
(3) Unit of Universal Movement

(Appendix No. A shows the sub units).

For the teaching of general science, I had kept in view the following objectives and specifications.

Objectives and specifications

(1) Acquiring knowledge of the fundamentals of science in everyday life.
(2) Developing ability to apply scientific knowledge in everyday life.
(3) Developing skill in handling apparatus in experimental procedure, in using and maintaining scientific appliances necessary in everyday life, etc.
(4) Developing skill in improving scientific instruments and apparatus.
(5) Forming the habit of minute observation of the surroundings.
(6) Developing scientific attitude in thinking and action.
(7) Developing interest in science.
(8) Developing ability to see the relationship between science and other subjects.
(9) Realizing the impact of science on the individuals and the social life of the people.

For these purposes I followed the following teaching methods and learning activities :

(1) Group discussion.
(2) Observation, self-study and discussion.
(3) Essays and individual projects.
(4) Collections and informations.
(5) Interviews and talks.
(6) Experiments.
(7) Models, charts and drawings.
(8) Cuttings.
(9) Question box.
(10) Library.
(11) Visits and self study excursions.
(12) Audio-visual aids.

(13) Exhibitions.

(14) Examinations at interval—both essay type and objective type separately.

For the better learning, the content was divided into sub-units. The programme learning was divided into students, and teachers' activities and the objectives and the specifications were laid down according to the sub-units. The undermentioned chart gives the accouut of the contents, activities and the objectives gained during the experimental work.

Contents	*Activities*	*Objectivies and specifications*
I Agricultural Unit		
(*a*) Soil and its type	(1) Visit to the overseer and labourers working near the school	(1) Knowledge of soil (2) Minute observation (3) Interest in science
(*b*) Manures, its type and utility	(1) Visit to a sewage farm and pumping station	(1) Knowledge (2) Application of knowledge (3) Interest in science
(*c*) Growing of food wheat, maize, jowar, millets, onions, vegetables.	(1) Students prepared a small farm on the school ground (2) Charts prepared (3) Preservation of the parts of the different plants (4) Visit to Multipurpose school at Kathvada (5) Visit to Agricultural College and Farm at Anand	(1) Knowledge (2) Ability to apply scientific knowledge in everyday life (3) Skill in handling apparatus and tools of farming (4) Knowledge of preservation of plants (5) Habit of minute observation of surroundings (6) Interest in science (7) Scientific attitude in thinking and action
II Physiology and Hygiene Unit		
(*a*) Personal Hygiene	(1) Students made collection of materials used for	(1) Interest in science (2) Knowledge (3) Application of scientific knowledge
(*b*) Cleanliness	Cleanliness, clothes in everyday use	
(*c*) Clothes	(2) A talk given by a Doctor	
(*d*) Parts of the body	(1) Visit to a medical exhibition at civil hospital	(1) Knowledge (2) Application of knowledge
III Units of Universal Movement		
(*a*) Movement of fishes, serpents, etc.	(1) Visit to the zoo garden at Kankaria (2) Charts showing the movement	(1) Knowlegde
(*b*) Pinhole Camera Kaleidoscope Reflection Magnetism	(1) Models made by the students (2) Experiments done by the students	(1) Knowledge (2) Application of knowledge (3) Skill in handling apparatus (4) Improvising scientific apparatus and appliances.

Generally for the visits holidays were utilized. For small visits, Saturdays were used. Though I had arranged a number of visits and talks on a large scale, I think that two or three visits and talks would serve the same purpose during the year.

For the class teaching work, I followed the plan of learning experiences for sub-units as shown in Appendix B.

Class library

I kept the library cupboard in the class. It was managed by the students committee. The library books consisted of (*i*) The text-books used in other schools. (*ii*) Extra books concerning the topics of the syllabus. (*iii*) The reference books for the teacher. (*iv*) Magazine on agriculture and science. (Appendix C gives the list of the books)

Work done by the students

Students of the project class prepared the models, charts, diagrams as shown in Appendix D. The students wrote various essays on such subjects as irrigation, Suez farm, etc., and wrote individual projects on topics such as the eclipse, surveying, Gober gas plant, etc. They collected different types of seeds, manures, germicides, clothes, etc. They arranged a few talks by the doctors and other experts and they performed experiments according to the syllabus and got direct knowledge of the subject by a few excursions as shown in Appendix E.

The teacher used Audio-visual aids, charts, and maps for making the subject easy and vivid (see Appendix F).

Evaluation of the project

I used the following tools of evalution :

1. Essay type examination
2. Objective type examination
3. Practical test examination
4. Journals
5. Display of exhibits
6. Collection and scrap books.

I. Essay type exmination

At the end of each unit one essay type examination was held. The paper contained the short questions, descriptive questions, short notes, and description of the excursions with scientific views. By the examinations, I could measure the abilities of the students such as thinking, reasoning, originality, appilcation of knowledge, recall, interpretation of facts and principles. After examining the papers of the pupils, I came to know that the students' hold over the language was very weak. The spellings of some of the students were inaccurate and instead of describing the excursions from a scientific point of view, the students gave importance to the coming, going, eating, walking and such other non-scientific activities. These defects were brought to the minds of the students by discussing the questions of the papers in the class. (Appendix G—The first essay type paper.)

II. Objective test examination

Formerly, the sole importance was given to the essay type examinations. The essay type examinations could not measure the skill, scientific attitude, behaviour, work habit and oral expressions of the students, so objective test examinations and practical test examinations were introduced along with the essay type examination.

The objective test paper consisted of objective testing questions based on different sub-units of the syllabus.

(1) True and false type

(2) Matching type

(3) Multiple choice type

(4) Fill up the gaps
(5) Recall type
(6) Figure identification type.

The students were advised to spend more time on thinking, selecting and understanding the question than to write down the answer hastily. The objective paper was of 30 minutes only. It consisted of 30 marks. The standard of passing was 66 per cent, *i.e.*, 20 marks out of 30 marks. Most of the students could reach the new standard of passing which was raised from 66 per cent to 83 per cent. (Appendix H shows the objective type question paper).

III. Practical test examination

The abilities such as recall, skill observation, improvising the apparatus, identification, handling the apparatus, selection of the apparatus, were tested by giving the students 45 experiments arranged in groups for different abilities. Two minutes were given to each student for each practical. The total marks were 45, *i.e.*, each practical carried one mark. (Appendix I shows the list of practical tests given to the students).

IV. Journals

The stndents kept the following journals during the year :

1. Practical journal for the experiments done by the students.
2. Individual project journals.
3. Class notebook.
4. Agricultural notebook.
5. Excursion notebook.
6. Notebook for the collected information, lectures and discussions.

The regular habit of keeping such notebooks and journals showed the work habit, regularity, day to day work and self-expression powers of most of the students.

This work was evaluated at the end of each unit and the students were assigned marks out of 15.

V. Display of exhibits

Most of the students were highly interested in the display of their exhibits. They held two exhibitions during the project period. Some of the students took keen interest in this work and arranged the exhibition by themselves, and others instructed and explained the exhibits to the visitors and other students. This showed the courage, oral expression power, good logical thinking and explaining the scientific instruments and phenomena. These abilities of the students were recorded and given marks. These students took part in the science exhibition at the Gujarat State level and won the second prize for their work.

VI. Collections and scrap books

The students were interested in collecting different types of rice, wheat, seeds, manures, soils, toothpastes, powders, clothes and many other things concerned with their study. Their work was evaluated at the end of each type.

The students kept scrap books for drawing figures of instruments of farming, diagrams of plants, insects, germs of different diseases, parts of bones, throat and other organs, etc. This work was also evaluated at the end of each topic and item and it was recorded. To assess the work of the pupils done during the project period a table was made to note down the mark for charts, models diagrams, collections, essays, etc.,

To give specific evidence to the changes brought in the pupils as a result of the experiments, I had adopted a technique of concentrating on two extreme streams : (*i*) bright students, (*ii*) other dull students. The table below speaks of this. (From P.R. and I.Q. and school work in the class, Group A and Group B were formed.)

PROGRESS REPORT OF TEN SELECTED STUDENTS

Sl. No.	*Names*	*Age Yr. Mt.*	*P.R.*	*I. Q.*	*Examination Ist Qrt.*	*Examination 2nd Qrt.*	*Objective test Ist Qrt.*	*Objective test 2nd Qrt.*	*Annual Essay*	*Exam. objective*	*Practical test*
	GROUP A										
1.	Solanki Thakarshi Mohanlal	14.1	95.6	128	84%	60%	73%	93%	84%	83%	78%
2.	Trivedi Dinesh Pramshankar	12.11	91	122	80%	75%	86%	83%	74%	90%	64%
3.	Shah Mahesh Himatlal	12.9	98.8	139	64%	69%	70%	90%	68%	76%	82%
4.	Vadacaria Bipin Savailal	13.00	95	127	69%	60%	60%	80%	66%	83%	78%
5.	Gandhi Kiritkumar Maneklal	12.11	91	122	49%	69%	70%	70%	40%	86%	75%
	GROUP B										
1.	Shah Jagdish Amratlal	12.8	60	114	29%	58%	57%	63%	48%	70%	56%
2.	Trivedi Shyam Hasmukhlal	11.3	52	101	31%	75%	50%	43%	30%	60%	51%
3.	Shah Naresh Ramanlal	11.10	91	122	53%	56%	57%	70%	50%	70%	62%
4.	Shah Ramesh Chimanlal	13.4	48	99	40%	60%	60%	60%	68%	54%	73%
5.	Patel Rajendra Ajit Kumar	12.11	21	87	56%	58%	53%	86%	50%	76%	64%

Observation of the Selected Students

Group A

Before the project work most of the students of this group were shy, quiet and did not mix with other students. They did not take active part in the class activity. Their intelligence was used only in cramming the subject-matter of each subject. Their other latent capacities and abilities also found expression.

After the project work they took part in the class discussion and showed their skill and their scientific attitude in practical tests. Their behaviour in the class and outside was excellent. They did not neglect the work of other subjects. The opinions of the other subject teachers showed that they took keen interest in their subjects and asked inquisitive questions about the various topics of subject. They formed the habit of keeping their notebooks, records, cuttings, collections and specimens neatly and systematically. They prepared hand-written class magazine 'Krushi Vignan' also. Their various articles were printed and published by the annual school magazine *Pathey*.

Later on they passed the S.S.C. in the engineering and medical lines (Appendix K).

Observation of the Selected Students :

Group B

Before the project work these students were normal or rather dull and shy and idle. Some of them were talkative, suppressed and day-dreamers. Their abilities were latent and undeveloped.

After the project work they tried to take part in the group discussion method by the written points. Due to the excursions their interest in learning was increased. They took part in discussions with outsiders and visitors. After several hints and greater encouragement, they formed the habit of keeping the records, notebooks, collected specimens and cuttings in a systematic method. Towards the end of the project year they developed a scientific attitude. They made progress slowly and steadily and none of them failed in the S.S.C. Examination. They required such type of encouragement in higher standard also.

My opinion about the project work

On the basis of my experience with the project, I strongly believe that teaching becomes more effective when based on scientific objectives with an evaluation approach. The following were the findings as regards the necessary conditions and the results.

(*i*) The experimenter should know the subject-matter thoroughly, and should organize it in well-planned units. He should arrange activities such as long and short excursions and talks according to the needs of each unit.

(*ii*) He should encourage the dull as well as bright students to keep records, collect specimens, models, charts, etc., and they should be checked at intervals and given marks according to the work done by each of the students.

(*iii*) He should keep regular records of the students' work.

(*iv*) Using this approach, it is possible to complete the work of the year, within the allotted period. The syllabus in general science for the class can be completed during the year.

(*v*) As the students get direct knowledge from the experts, their knowledge shows greater depth and assimilation. They read extra books on the same subjects and topics.

(*vi*) By doing the work of preparing charts, models, cuttings, etc., the students remain engaged in their work. Thus, they get confidence and avoid extra-tutorial classes conducted by the laymen in the city.

(*vii*) The experiment must be encouraged by the school authorities. The other teachers also should co-operate with and should introduce such experiments in their own subjects.

(*viii*) The work done by the experimenter should be published in the form of a h andbook, so that other teachers may be guided and encouraged to continue the project work in the next year in the same standard.

APPENDIX A

(I) **Agricultural Unit**

It contained observation of soil, constitution of soil, useful ingredients of the soil to the plants, types of soil, manure and its types and its utility. Grow more food, difficult types of useful crops such as wheat, rice, millet, jowar, maize, potatoes, onions, vegetables, etc.

(II) **Physiology and Hygiene Unit**

Personal Hygiene, cleanliness, rest, sleep, work, exercise, habits and clothes.

(III) **Unit of Universal Movements**

(*i*) Movement of serpent, earthworm, lizard, ant, scorpion, bees, birds, fishes, jelly-fish.

(*ii*) Movements of light. How light travels, pinhole-camera, reflection, multiple images, kaleidoscope, periscope, etc.

(*iii*) Transference of heat.

Effects of heat—conduction, convection, radiation, appliances on principles of heat, *e.g.*, Davy Safety Lamp, thermosflask, etc.

(*iv*) Magnetism.

Uses of magnets, types of magnets, the rules of magnetization, preparation and destruction of natural and artificial magnets, mariner's compass, magnetic field and its lines of force.

APPENDIX B

PLAN OF LEARNING EXPERIENCES

Objectives : 1.____________________

2.____________________

Serial No. ______________

Subject : ______________

Teacher : Shri__________________Std.________

Date ________________

Analysis of the content to be taught	Objectives with their specifications	Learning Activities	Remarks (Teacher's general approach, equipment, time, general evaluation, etc.)

APPENDIX C

Reference books used by the Project class of Std. VIII E

A. Textbooks

Copies 1 to 10	Samanya Vignan Parichay	*by* Nanavati Shah & Shah
11 to 19	,, ,, ,,	*by* Kshirsagar and Trivedi
20 to 29	Kishoronoo Samanya Vignan	*by* Desai, Sheth & Desai
30 to 39	Saral Prakruti Vignan	*by* Naik and Desai
40	Nutan Samanya Vignan	*by* Mehta and Mankad

B. Reference books for boys

41-42-43	Sharir Vignan	*by* V.N. Bhave
44-45-46	Arogya Shastra	,,
47	Pashu Palan	*by* Ishwar Krisikay
48	Bagayat	,,
49	Kathirmanthi Kanchan	,,
50	Varshan ni Vahre	,,
51	Padar ni Vanaspati	*by* Manubhai Jodhani
52 to 169	Other books	

C. Books for teacher's reference

170	Preservation of Fruits and Vegetables	*by* Girdharlal Tendore
171	Joint Farming	*by* Vharanging
172	Pocha's Garden Guide	*by* Pestanji P. Pocha
173	Vanaspati Industry	*by* Natliangandi
174	Information Leaflet	

D. Magazines

175 *Krushi Govidya*
176 *Vikas*
177 *Gramya Jiven* and others.

APPENDIX D

Models, charts and diagrams prepared by the students

Models

(I) Clay Models :
  (1) Tomato
  (2) Guava
  (3) Mango
  (4) Banana
  (5) Carrot
  (6) Chillies
  (7) Pomegranate
  (8) Potato.

(II) Other models :
  (1) Periscope
  (2) Kaleidoscope
  (3) Pinhole camera
  (4) Ram Sita and Sita Ravan (magnetic model).

Charts and Diagrams

(1) The vitamin tables.

(2) A table of composition of milk and its products.

(3) A table of composition of wheat, rice, millets, maize, etc.

(4) Different types of cuttings, *Clipping*, etc.

(5) The tools used in agriculture.

APPENDIX E

List of talks and Excursions

A. The list of persons interviewed and talks given by them :
   1. A talk given by Shri Vinod, Asstt. Director of Ahmedabad Sewage Farm.
   2. A talk given by a doctor at Kathwada.
   3. A talk given by the Principal of Physical Education Institution at Ahmedabad.
   4. A talk by the Chief Chemist of the Starch Product, and others.

B. Excursions :
   1. A visit to an overseer near the school building.
   2. A visit to a sewage farm and pumping station.
   3. A visit to an agricultural farm at Anand.
   4. A visit to Amul Dairy at Anand.
   5. A visit to a Maize Starch Product at Kathwada.
   6. A visit to Gobar Gas plant at Kathwada.
   7. A visit to Zavery farm and dairy at Kathwada.
   8. A visit to an Arogya exhibition at Civil Hospital, and others.

APPENDIX F

A list of teaching aids

I. Audio visual aids

1. Film strip project or
2. Micro projector
3. Epidiascope
4. Projector
5. Microscope
6. Radio

II. Maps and charts

1. Germination of seeds
2. Modification of roots
3. Modification of stem
4. Typical flower and its parts
5. Charts showing the causes for the spread of disease.
6. Charts on personal hygiene and others.

APPENDIX G

Date January 28, 1961
Sub:-General Science
Std. VIII (Project Class) Total Marks 50
Essay Type
Test Paper I (Soil)

Hint : (1) Read the question carefully.
(2) Answer the question as demanded.
(3) All the questions are compulsory.

Q. I. (*a*) What is manure ? What is the necessity of manure ? (2)
(*b*) Describe the preparation of natural manure. (4)
(*c*) Distinguish between the natural and artificial manure. (3)

Q. II. (*a*) State three scientific reasons for the scarcity of food in India. (4)
(*b*) Distinguish between Indian and Japanese method used for growing the rice. (3)
(*c*) What do you mean by monsoon crop and winter crop ? (*Give two illustrations of each*) (2)

Q. III. (*a*) Write a short note on "Suez Farm". (5)
(*b*) Describe briefly the scientific observations made by you during one of the excursions. (5)

Q. IV. Describe the scientific principles from the following statements :
(1) "Undhiya Party" is kept only in winter.
(2) Shared Purnima is chosen for "Milk and Pauva".
(3) "Annakut" is held on the new year day.
(4) The maidens grow "Juwara" in "Gauri Vrata".
(5) Til sweet balls are eaten on "Makar Sankranti"*.

---

* And such other questions were asked.

APPENDIX H

Date : January 28, 1961

Std. VIII E

Sub:-General Science

Total Marks : 30
Time : 30 Minutes

Test Paper II (Soil)

Name of the Student :

Instructions :

Q. I. When a soil lump was thrown in the jar of water, the following four layers were seen ;

a ...... layer
b ...... layer
c ...... layer
d ...... layer

Fill up the blanks

Q. II. Fill up the blanks, electing appropriate words given in the brackets

( ) (1) Jowar is affected by__________disease.
(Geru, Katra, Ratdo, Anjio and such others).

Q. III. Read the following statements and make cross (×) if wrong and make a tick (√) if correct in the brackets given against them.

( ) (1) Ploughing, scissors, and water brings more crop.
( ) (2) The water of some wells is salty because they are deep.*

Q. IV Select the appropriate number of items from the part B and put it into the brackets given in part A

	Part A	Part B
( )	(1) It is used in removing weeds.	(1) Rice
( )	(2) It needs more rain, more heat and fertile land.	(2) Guard
( )	(3) It is suitable for vegetable and fruits and flowers.	(3) Ringas
( )	(4) It has yellow flower	(4) Trevad
( )	(5) They are creepers	(5) The soil of garden
		(6) Wheat
		(7) Black soil
		(8) Ladies finger
		(9) Chillies

Q. V. Fill up the blanks from memory

(1) By______________the roots of the plants suck salts and water*

A story was given as Q. VI and the students were asked to tick out before the correct process statements.

---

* And such other questions.

APPENDIX K

Opinions of some students of Project Work

The following is the opinion of Solanki Thakarshi Mohanlal of Group A.

"Through the project work, I got deep insight in General Sciences. Practicals, drawing diagrams, excursions and other activities have made my knowledge more exact and thorough and I have developed the skill and application abilities in me. I have passed the S.S.C. Examination with more than 70% marks and at present I am studying in B.E. Course. There, I work with the same zeal and interest as I did in the project work in my school."

Trivedi Shyam Hasmukhlal of Group B says as follows :

"At first I did not take much interest in the study of General Science. Through the project work, I took more interest in the study. I made a steady progress in my study. I passed the S.S.C. Examination with more than 60% marks and at present I am studying in the first year B.Sc. Course. I am thankful to the school for having such project work."

Others also say so.

APPENDIX M

Annual Examination 1959

Date : April 16, 1959 Std. VIII

Sub:-General Science

Hints : Draw neat diagrams whenever necessary.

Q. I. Give scientific reasons (any six)

(1) A chimney is kept on the roof of a kitchen.

(2) Oily substance is found in pleura.

(3) Laxatives should not be used daily.

(4) Kidneys work more in winter.

(5) The natural manure is more advantageous than the artificial one.

(6) Onion is highly valued by the poor.

(7) Ice is kept in powder of wood.

(8) The blacksmith heats the iron ring before fixing it on the wooden wheel.

Q. II A. "During the combustion of candle carbondioxide and water are formed".

Describe the experiment to show the effect of heat on the volume of liquid.

B. Write the names of the organs of digestive system and explain the digestion in stomach.*

---

* And such other questions were asked.

APPENDIX I

PROJECT CLASS : VIII E

Date April, 26th 1961 *Practical Test* *Total Marks 45*

Report of : ______________________

Abilities	*Recall*	*Recognize*	*Skill*	*Observation*	*Impovising*	*Identification*	*Handling the apparatus*	*Selection of the apparatus*	*Remarks*
Practicals	1	2	3	4	5	6	7	8	9
1. To light and extinguish the spirit lamp.									
2. To put down the hot crucible.									
3. To select the apparatus to heat water.									
4. To state the scientific principle and to draw the given picture.									
5. To filter the impure water.									
6. To get the image of the flame of a candle by the water filled flask and a screen.									
7. To measure the depth of water in a measuring cylinder.									
8. To recognize the poles of a magnet.									
9. To distinguish between the magnet and an iron rod.									
10. To arrange the apparatus to show the burning candle in a water filled flask.									
To identify the given plants and seeds.									
11. The inflourescence of the male flowers of the maize.									
12. The seeds and the plant of onion.									
13. Seeds of Karela.									
14. Seeds of Gourd.									
15. Seeds of Chillies.									
16. Seeds of Tomatoes.									

	Abilities									
	Practicals	1	2	3	4	5	6	7	8	9
	To identify the following vertebra.									
17.	First vertebra.									
18.	Second vertebra.									
19.	Common vertebra									
	To identify the joints.									
20.	Ball and socket joint.									
21.	Hinge joint.									
22.	Gliding joint.									
	To identify the tools of farming and to state its uses.									
23.	Trevad									
24.	Plough									
25.	Khurpi									
26.	Disinfectant Pump									
	To recognize the given manure and insecticide									
27.	Ammonium Sulphate									
28.	Potassium permanganate									
	To state the seasons in which the following fruits are growing. (models)									
29.	Pear									
30.	Tomatoes									
31.	Carrot									
32.	Banana									
33.	To find the number of images in inclined plane mirrors at the angles 60°, 72°									
34.	Periscope									
35.	Kaleidoscope									
	To show the area for the growth of									
36.	Rice									
37.	Wheat									
38.	Millet									
39.	To show the direction from the cross made on the table									
40.	To show the false ribs from the skeleton									
	To show the various parts of the body from 'torso'									
41.	Heart									
42.	Lungs									
43.	Diaphragm									
44.	Small intestine									
45.	Stomach									

7

Examination Reform

A. P. Oza

"IT MAY BE POINTED out that the success of this entire programme depends upon the willing co-operation of the teachers. Unless they accept this change as a worthwhile improvement in the present system of education and decide to raise the quality of education and through better techniques of teaching and testing no reform worth its name will be possible." This statement from *Setting Better Questions—Elementary Mathematics* published by the Gujarat S.S.C.E. Board, shows how important it is to enlist the co-operation of the working teachers and to train them in this new technique of examination reform.

In this paper an attempt is made to survey in brief the writer's experiences and experiments in this field from 1953 to 1966. The topic is discussed under the following sub-heads :

(1) A brief historical survey from the near past to the present.

(2) The various experiments tried out in this interval.

(3) The hurdles experienced in these experiments.

(4) Methods tried to overcome some of these hurdles.

(5) Some modest suggestions.

Historical survey

When I was a student, I appeared in examinations in which there were five to ten questions each carrying twenty to ten marks respectively. There were wide options and the papers never covered the entire syllabus. As one of our teachers used to tell us it was easy to score first class marks by guessing the likely questions. Standard notes passed from the notes of the teachers to the notes of the students without affecting, perhaps, the brains of either. I remember, I lost sixteen marks in arithmetic in my examination of Standard VII for a trifling mistake. Of course, even in those days a question of the type "Fill in the gaps" appeared. Generally, this question was prepared by dropping a word or two from the textbooks. After I became a teacher the questions of matching type tests also were seen in question papers at times. But these questions did not satisfy the demands of new type testing. By about 1950 a test in multiple-choice item appeared in the public examination. The Gujarat S.S.C.E. Board hopes to introduce 30 per cent objective test items, 32 per cent short answer questions and 38 per cent essay type questions in elementary mathematics, general science and social studies in the near future. New type test items have also begun to appear in Gujarati, Hindi and English. Even then, the contents and the approach to teaching is still guided by the blue-prints supplied by the Examination Board. Fixing the objectives of teaching and specifications of these objectives is a question still at the stage of seminars and training colleges.

Experiments tried out

I tried an experiment in 1953. A new type test was set in geometry to students of Class X in one periodic test. The distribution of marks (out of 50) was as under :

Range	*Frequency*	
32-38	2	
25-31	5	
18-24	10	Mean 16.28
11-17	10	
4-10	13	
Total	40	

The entire paper was on a new basis. The paper was set by the teacher teaching the subject. One copy of the question paper was distributed to all teachers teaching mathematics in the school.

The following important observations were made :

(1) If new-type tests are to be used in the final examination, they should be used as teaching and testing devices during the earlier years.

(2) Teachers should be trained to prepare such test items.

(3) Some procedure should be found to check copying in such tests. In spite of highest precautions, pupils known pesonally to the teacher as very backward scored ten marks.

(4) No one scored more than 38 marks.

(5) Personal contact between the teachers and the taught should be increased so as to get some idea of correlation between day-to-day study and such tests.

(6) Experimentation is necessary to determine the proportion of various types of questions in public examinations.

In 1954, an experiment on a larger scale was tried. The question paper on algebra (Class IX) meant for all the schools of Rajkot district was prepared on these lines. Out of 60 marks 42 marks were allotted to objective questions and 18 marks to traditional questions. Options in both types of questions were given, it being a new experiment. The figures of all schools were not collected. In one big high school—Alfred High School, Rajkot, the mean was 32.46 with an S.D. of 10.80. This is somewhat better than the earlier experiment, perhaps due to the use of earlier test items.

No critical ratio is calculated because in the first experiment the number was 40, while in the second it was more than 200.

In between 1954 and 1957 also an attempt was made to give new-type test items in the various examinations, but systematic recording was not done.

From 1958 onwards new type tests were introduced in the high school where I was working as Headmaster. They were introduced in periodic tests as well as in the annual examinations. Class X being Pre-S.S.C. class was not subjected to any experimentation. Of course, even in Class X new-type tests were introduced from 1965 as suggested by the S.S.C.E. Board, Baroda. The question paper in languages contained a few new type items but the question paper in elementary mathematics, general science and social studies contained such items in a greater proportion. Use of scrap paper was also allowed. The following table gives a comparison of the situation between the years 1960-1966 :

From the table the following conclusions can be drawn :

(1) In all cases, where comparison is made, the CRs reveal that the differences between the means are highly

Total Marks : 80

			General Science				Social Studies				Elementary Mathematics			
Class	Year.	No.	M.	S.D.	C.R.	Significance	M.	S.D.	C.R.	Significance	M.	S.D.	C.R.	Significance
8	1960	362	40.80	12.23	6.20	.01	42.14	11.96	6.20	.01	32.36	11.45	8.87	.01
8	1966	342	46.82	11.76			48.38	12.00			40 70	12.20		
9	1960	360	42.00	12.24	6.21	.01	45.00	12.25	7.62	.01	41.14	13.10	9.57	.01
9	1966	260	48.35	11.80			52.34	10.56			50.23	12.08		
10	1960	380												
10	1966	262	41.35	12.60			50.00	12.51			42.64	12.48		

significant even at .01 level. This shows that there is very bright future for this type of testing.

(2) Such comparison after the reorientation of teachers is likely to reveal much more to the research student.

(3) The proportion of objective items, short answer items and essay type items differs in all classes.

It is experienced that when this type of experimentation is new to students the results are not happy. The following table showing the mean marks of Class VIII in elementary mathematics in one periodic test corroborates this statement :

Range	*Frequency*
31-35	4
26-30	8
21-25	10
16-20	76
11-15	71
6-10	162
1- 5	53
Total	384

Total Score 50
Mean 11.30
S.D. 6.15

In one annual examination ten questions on figure reading in geometry were set. No student could work out more than six questions. These questions were set on the lines of Senior Cambridge or Indian School Certificate Examination. It should be noted that figure reading should be considered an important aim in the teaching of geometry. The percentage number of students attempting correctly one, two,......six questions is given in the following table :—

The question was optional for Class X.

	Percentage	*Attempting*	*Correctly*
Items	*Class VIII*	*Class IX*	*Class X*
1.	12.30	11.90	4.18
2.	14.85	10.85	6.20
3.	10.00	9.80	8.20
4.	9.14	9.80	8.16
5.	10.00	3.15	13.20
6.	12.70	2.80	12.50

The last experiment that the writer had was in connection with one project in arithmetic in Class IX on municipal taxation. After the project was over an attempt was made to evaluate it with the help of a multiple choice test of 20 items. Here are its results :

Groups	*Mean Out of 20*	*S.D.*	*C.R.*	*Significance*
Control Group	12.34	2.41		
Experimental Group	15.50	2.31	5.64	.01

As a corollary the marks of this test helped the writer to study certain individual cases scoring marks either above their level or below their level. It is here that topic-wise tests are found useful in scholastic guidance. Such tests also give a choice to the teacher to think deeply on different topics. They also help in diagnosis.

Hurdles experienced

There were various types of difficulties in the way of trying new-type tests in the annual examination in four different high schools. These were pertaining to : (A) Teachers, (B) Students, (C) Administration.

(*a*) *Teachers*

The teachers did not know the techniques of new-type tests. At times, even when they were given a model of a multiple-choice test, some of them failed to grasp the difference between sentence completion tests and multiple-choice tests. Some of these teachers were recently trained. It was necessary to ask them to recast the test (sometimes twice) even after guiding them. Some conservativeness, apathy towards change and lack of sincerity were also visible. Under the circumstances, it was not easy to make them understand the main four fields in cognitive evaluation—Recognition, Recall, Interpretation with evaluation and Application with use. To lead them to the technical side of testing was an up-hill task.

(*b*) *Students*

The students were also not accustomed to the methods of recording responses. The whole process of testing was foreign to them. As a result, at times, good students also scored below their capacity. Even in short answer questions carrying two marks they filled pages and pages. At times, they knew the answer but did not understand how to put the answer. When the same question was put to them orally, many of them could attempt it successfully. This, perhaps, reveals that a novel situation came in the way of their thinking. Copying was also common. This was detected from common, strange, wrong responses. The writer was reminded of his college days when a partition was erected between two students on the writing table to eradicate this evil. It was felt that faulty multiple-choice test items disturbed the students particularly in mathematics. In reality, a multiple-choice question is one for which the student does not supply the answer but chooses it (Walker). The simple Recall Test may be more useful in mathematical and physical sciences where the stimuli appear in the form of a problem requiring computation. Multiple-choice questions may be useful in measuring inferential reasoning, reasoned understanding or judgment and discrimination. A majority of items in the model paper supplied by the Gujarat S.S.C.E. Board in elementary mathematics require computation and are not good multiple-choice test items. The following two items are given by way of illustration of good multiple choice items :

(1) The factors of $x^2+2x-3599$ are :

(*a*) $(x+61)(x+59)$ (*b*) $(x+61)(x-59)$
(*c*) $(x-61)(x+59)$ (*d*) $(x-61)(x-59)$

The students have simply to decide the signs of 61 and 59 and select the proper pair.

(2) The volume of a cone with height 50 meters, radius of the base 350 meters is— cubic meters. $\left(\pi = \frac{22}{7}\right)$

(*a*) 19250000 (*b*) $\frac{19250000}{21}$

(*c*) $\frac{19250000}{3}$ (*d*) $\frac{18250000}{3}$

The students would reason out as under:

(*i*) 350 and 50 do not contain 3. The formula is $1/3\pi r^2 h$ and hence there must be a 3 in the denominator in the answer.

(*ii*) 350 has 7 as a factor and hence 21 cannot be in the denominator of the answer.

(*iii*) 1825 does not contain 11, $\because (8+5)-(1+2)$ is not divisible by 11.

(*iv*) Hence (*c*) is the solution. There is no need of any computation.

(*c*) *Administration*

(1) To set a new type test the teachers require a longer time. It is more advantageous to give the setting work to teachers who are actually teaching the subject in a particular year. If this setting business is revealed earlier, it is likely that a part of the question paper if not the whole, is likely to leak out. An appeal must be made to teachers to stop this evil. Putting faith in teachers is also necessay.

(2) In new type tests, sometimes figures are necessary. Blocks are to be prepared. The press also experiences trouble in the composing work. Proper spacing is also required. In all these stages, there are greater chances of leakage. The question of higher cost also requires consideration. Even when the work is done in a government press, the question of larger amount of stationery to be used comes in the forefront.

When cyclostyling is undertaken, a batch of teachers is required to handle the machinery at different stages and again the question of leakage comes in.

Methods tried to overcome some of the hurdles

The following methods were employed to overcome some of the above hurdles.

1. To prepare the background, discussion about this reform was opened in the informal talks of the common-room. A series of talks followed by discussions was also arranged. Model papers were distributed and discussed.

2. Some selected colleagues were entrusted with the work of setting this type of tests. The teachers were encouraged to set such tests in the periodic examinations and daily assignments so that they could be used as teaching devices also. The students were also made familiar with the new situation.

3. The teachers were guided to prepare a two-way blue print on the lines of the model supplied by the Gujarat S.S.C.E. Board containing the contents and broad specifications.

4. Some specific test items were discussed in small groups of teachers.

5. The teachers were encouraged to study the series of tests prepared under Scheme 2 (*b*) Second Five Year Plan by the M.S. University of Baroda and published by Orient Longmans, Ltd. (*Baroda studies in Mental Measurement*). This whole set was ordered for the library with their manuals. The teachers were also advised to read the relevant literature on new type tests specially added to the library. Some such literature was supplied by the NCERT.

6. A series of papers was prepared throwing light on the new type technique by

the present writer. These papers were read and discussed in group meetings and later published in *Adhyapan* a monthly organ of Akhil Saurashtra Madhyamik Shikshaka Sangh.

7. Teachers were advised to jot down the points for evaluation during the learning-teaching process so that the situations in learning and evaluation may be similar or nearly similar. They were also advised to prepare test-items of different types and submit them for discussion and criticism.

8. The authorities of the Press were approached and an explanation as to why this reform is necessary was given to them.

9. An appeal to the good sense of teachers and students was made, whenever an opportunity occurred to eradicate or lessen the evils of leakage and copying.

Some modest suggestions

From these various experiments and experiences the following modest suggestions are offered :

1. Intensive continuous training for teachers is necessary both at school level and training college level.

2. The usual assignments in different subjects should be given in all different types of evaluation—New Type Tests, Short Answer Tests, Essay Tests, Project Work, etc.

3. Evaluation Technique should be a compulsory item for any teacher training programme.

4. All schools should be supplied with such literature in the regional languages, if possible.

5. There should be a compulsory examination on evaluation techniques for all teachers below 50.

6. Teachers who are actually teaching the subject should be taken in confidence and prepared in the technique of new type testing.

7. To remove the fear of an approaching examination some internal assessment method should be evolved. This assessment should take into consideration the oral expression, the practical skill as well as the co-curricular activities.

8. The setters should be given work very early so that they can give proper thought to each item.

9. Special grants should be given for research in this direction to the working teachers.

10. The training colleges should prepare good test items in collaboration with schools.

11. Different Standardized Achievement Tests should be made available to all schools.

12. More seminars, workshops, etc., are necessary for the teachers.

13. A greater liberty should be given to schools performing such experimental work.

14. Continuous research is necessary in this field for deciding the types of tests, the proportion of various types of questions, preparation of tests for individual topics of the curriculum, diagnostic tests in different subjects, etc.

15. Teachers should be specially trained to work as invigilators in this type of testing programme. It is also necessary to train them for the assessment work.

16. The multiple-choice test was found to be more useful in general science and social studies. However, instead of employing only one device of testing the other device may also be tried profitably keeping the problem of 'Mind-Set' in view.

17. Other types of testing procedures may be evolved after proper experimentation.

18. Cyclostyling may be found to be more useful while introducing this reform.

19. Books of the type, (1) *Taxonomy of Educational Objectives*—Bloom (2) *Measurement in To-Day's Schools*—Ross, may be translated into various regional languages. Original books on these lines suitable for our environment may also be got prepared.

In all these phases the teacher is to occupy the central place. His co-operation should be enlisted in all ways. His capacity should be tapped in all directions. This will be possible by giving him re-orientation both in methodology and contents of the various subjects. The world changes very fast and the teacher has to teach, sometimes, something different from what he learnt.

Unless teachers keep themselves alert and are always prepared to adjust their teaching to new developments taking place in life and in the world of knowledge, they will not be able to play their role in moulding the citizens of the future.

8

Remedial Teaching in Arithmetic

Choithram P. Sadhwani

REMEDIAL TEACHING is, really speaking, a reformed and well planned teaching. It is planned to meet the needs of those students who are below the average standard of their class. This plan includes finding out the backward students, diagnosing their weakness, removing it and helping them to form better study-habits leading to better achievement. This method of diagnosis will also bring to light such students who commit mistakes only because they have not grasped the right way of following the fundamental processes. It is, therefore, essential that at first they should be made familiar with these processes. This plan of teaching can successfully be carried out either with individuals or with small groups. It can also be applied to some other subjects where we have some students who are below the class level, but here we are concerned only with mathematics.

At present, mathematics is compulsory up to the secondary level in most of the states in our country and it is very useful too in our day-to-day life. But it is a pity that many students not only lack interest in the subject but also entertain a strange fear of it. A good book can be produced if we begin to write about the importance of the subject. According to Bacon :

"Mathematics is the gateway and key of the science. Neglect of Mathematics works injury to all knowledge, since he who is ignorant of it cannot know the other sciences or the things of the world."

It is a well known fact that a large number of secondary school students are unable to work out fundamental mathematical processes correctly. Some commit mistakes in multiplication and division, some are scared at the sight of decimals, while some cannot work out questions on simple fractions. All these difficulties impede the students' progress and are a subject of anxiety to teachers, parents, businessmen and administrators.

The subject of mathematics is a connected whole, *i.e.*, one process depends on the other and hence a weakness in any process will lead to a failure in understanding the next. In such cases, the aim of remedial teaching is to find out the standard of attainment of the child, his difficulties and to try to bring him to the class-level so that he may feel interested in the subject and may be able to attain proficiency in it.

The main process of remedial teaching can be divided into following heads :

1. Identification
2. Diagnosis
3. Remedy.

IDENTIFICATION OF STUDENTS FOR REMEDIAL TEACHING

It is not very difficult for a teacher to find out in his class such students who experience difficulty in arithmetic. The following points may help us.

1. *Marks Obtained in the Previous Examination*

The level of the child can be estimated by the marks obtained by him in the previous examinations. But it often happens that this record may be average or above average and the candidate may still be backward. Therefore, we cannot depend entirely on this record.

2. *Observation*

A teacher, after teaching a class for some days, forms his opinion about some children and regards them as backward students. But a skilled teacher tries to base his opinion on facts. He examines the home work, observes his behaviour in the class and watches his alertness in his working. In this observation the more objective a teacher is, the more successful he will be in his goal of spotting the children in need of help.

3. *Teacher-made Arithmetic Test*

These tests have proved successful to a great extent in locating backward students in arithmetic. An enthusiastic teacher, planning to conduct remedial teaching, will not wait for the general school test. He knows that these short-time tests based on a lot of subject-matter are ineffective in locating the backward children and their specific difficulties. He, therefore, administers his own tests after finishing a unit, so that the matter taught may be tested and the backward children spotted out. These tests are generally conducted either in his period or at any time before or after the school hours.

4. *Standardized Achievement Survey Tests*

Such tests are generally not available for use in our schools. And those that are, are not used with any enthusiasm or understanding. There may be a number of reasons for it. It is evident that in our present educational system, the teacher under training comes across the names of such tests but he or she is not thoroughly familiar with their working and their underlying principles. Besides, today a number of mathematics teachers are untrained and are ignorant of the technical methods. Some such tests are given in the Appendix. These tests have proved successful in spotting out backward students in mathematics. They also point out the topic wherein the child feels difficulty.

If all the four devices, mentioned above, are used with balance, it will be good, but if this is not possible the first three devices will help the teacher to locate pupils for remedial teaching. This has been my personal experience.

The earlier the task of identification is completed the better it will be for the teacher as well as for the pupil. By early I mean in the first or second month at the beginning of the session or at the end of it, so that the difficulties may be skilfully removed in the next session. As occasions arise, the teacher may arrange such teaching at any time he thinks fit.

It is important that the child while practising these processes, must not know that he or she is being selected for remedial teaching. Remedy or medicine is often bitter and it may sometimes make the mind of the patient repugnant. And, therefore, it may be pointed out to the pupil that he or she is being selected to improve his or her knowledge of arithmetic by modern methods of teaching.

DIAGNOSIS

After selecting the backward students, it becomes necessary to diagnose their attainment properly so that their specified difficulties may be known. The reasons for their difficulties can be found out only by proper diagnosis. Marks obtained by the pupils, observation, teacher-made tests and standardized achievement survey tests point out what topic or process remains uncomprehended by the pupil or pupils, but it still remains to be known that the particular mistake is caused by a lack of understanding of a particular fundamental process. It can be known by Arithmetic Diagnostic Tests and by asking the pupil to answer the questions by orally giving the steps of the process. Some diagnostic tests are given in Appendix B.

In the conditions prevalent in our country, it is not easy to get diagnostic tests everywhere, but the teacher, with the knowledge of these tests, can prepare them according to his needs. Their construction does not need any technical process, as for example, if the understanding of simple fractions is lacking in a child, the teacher himself can think of the fundamental processes regarding fractions, he may discuss them with his colleagues or he may frame four or five simple questions based on each process. Thus, it is possible that nearly a hundred questions may be framed on simple fractions. These questions will serve the purpose of a diagnostic test. The aim of these tests is neither to measure the knowledge of the child nor to compare him with other children, but to understand his own difficulties and wrong habits.

Along with these diagnostic processes, the teacher should, as far as possible, try to know something about the child's general health, his physical and mental conditions, his home and school environment, and his peer group. If he thinks necessary, he should seek help from other persons like the doctor, psychologist, counsellor, guardians, etc. In this process of diagnosis, the teacher will himself get as much pleasure as a doctor in his successful operation and a Yogi in the success of his Yoga.

Some common mistakes, listed below, are often committed by backward students in arithmetic. These are to be seen at different stages of the secondary course, though the processes may have been learnt at the primary stage. The foundation has remained weak.

Addition

1. Unable to place numbers appropriately, *i.e.*, $\left\{\begin{array}{l}125\\22\end{array}\right.$
2. Mistakes in carrying, *e.g.*, 111+1 & 999+1
3. Mistakes related to the cipher, *e.g.*, 9+0 & 908+209
4. Continued addition, *e.g.*, 13+13+13+13

Subtraction

1. Unable to put numbers on appropriate place, *e.g.*, $\left\{\begin{array}{l}123\\52\end{array}\right.$
2. Mistakes in borrowing, *e.g.*, 1100–1 & 111–1
3. Mistakes related to nought, *e.g.*, 9-0 & 908–209
4. Mistakes in subtracting many quantities, *e.g.*, 65–13–13–13

Multiplication

1. To ignore the carried number, *e.g.*, 345×3
2. Related to the cipher, *e.g.*, 5×0 & 105×3
3. Continued multiplication, *e.g.*, 3×3×3×3
4. Mistakes in the multiplication of some typical numbers, *e.g.*, 1, 7, 9, 13, 17, etc.

Division

1. Unable to make appropriate groups of dividend *e.g.*, 3)1395(& 13)1053(
2. Related to nought, *e.g.*, 3)3015(
3. Mistakes of leaving the remainder

and sometimes using larger remainder than divisor

4. Mistakes in subtraction and multiplication.

Decimal fractions

Along with the mistakes pointed above, the children are inaccurate in decimal multiplication and division and often commit mistakes in placing the decimal point. On the other hand, I have experienced that some children are altogether ignorant of division of a decimal quantity by a decimal quantity and of an integral quantity by a decimal quantity. This also points to our teaching inefficiency.

Simple fractions

1. Mistakes in the process of division.
2. Mistakes in comparison of fractions.
3. Mistakes in reduction of fractions.
4. Mistakes of L.C.M. while adding or subtracting.

Some typical errors committed due to some unhealthy habits

Some children commit similar mistakes as a result of wrong habits which have become fixed. For example, a child always wrote and said $8 \times 9 = 65$, another always said and wrote $13 \times 7 = 71$ and on account of this a number of their answers were wrong. The first student said $8 \times 8 = 64$ but in 8×9 the other number is one more than eight and, therefore, the multiplication is 65. He was not ready to accept $8 \times 9 = 72$. Then some concrete materials were put before him and then he could realise his mistake. On the other hand the other child, only remembered the wrong table. Therefore, it is necessary to be aware of such mistakes in diagnostic process.

Children experience more difficulty in solving problems than in manipulating fundamental processes. Some children, though they can use the fundamental processes properly, commit mistakes in problems. Their reasons are seen to be as follows :

1. Reading the problem carelessly and solving it without fully understanding it.
2. Reading disability and ignorance of mathematical vocabulary.
3. Inability to analyse known and unknown quantities.
4. Lack of skill in solving the fundamental processes.

REMEDY

After the detailed diagnosis mentioned above, proper remedial and improvement work is necessary. There are three prevalent approaches to remedial teaching.

1. Bond theory

When the facts are first learnt by the children, it is necessary that the bonds involved in the learning should be properly organized. This approach emphasises the laws of readiness, exercise and effect in learning. For example, if there is a difficulty in simple addition, each of hundred bonds of the addition $(0+0$ to $9+9)$ should be taught, exercized and rewarded. This method is to be utilized in every process of arithmetic. This approach can be seen in the works of Thorndike.

The main limitation of this approach is that insight developed while working on different processes is not stressed sufficiently.

2. Structural approach

The child is given concrete materials to reform his diagnosed wrong habit and he learns the process in the right way under the guidance of the teacher. Thus he gets a chance to develop an insight and he does not commit similar mistakes in future. This approach can be seen in the works of Stern and Dienes.

This approach has also certain limitations. One is that a teacher cannot always gather all the concrete materials connected with the different processes and the other is that the students of higher classes need a different type of motivation.

3. Real life approach

This approach connects teaching with the daily life of the students. This is very useful in remedial teaching in the solving of problems. It tries to find out problems from the students day-to-day life which the students solve properly. Then the students are told to solve problems of a similar nature. For example, a child has difficulty in decimal subtraction, say (5.05—3.56). The teacher should at once make it meaningful, *i.e.*, he must give a concrete example. For example, I have five rupees five paise and you have three rupees and fiftysix paise. Who has more money ? And how much more ? And if there is still difficulty the teacher must give eight rupees and sixtyone paise to the student and make him know the full process.

In remedial teaching, the teacher can utilize all the three approaches together according to his need. Along with detailed exercises and sufficient revisions, speed and accuracy cannot be ignored in removing diagnosed mistakes. Some material connected with the practice are given at the end of this essay.

The following points need attention :

1. The student should be properly introduced to mathematical signs and vocabulary.
2. Many processes should neither be taught nor tested at a time.
3. Practice in oral and written work should be properly organized. After doing sufficient practice, other processes connected with the previous one should be introduced.
4. Every student should taste the joy of success. This maxim has proved very useful to backward students in mathematics. Even if a teacher has to go far below the standard of the class, he should not worry about it. This will create self-confidence in the student. Sometimes, incentives from the teacher and appreciation of the student's effort may also help him.
5. Every school must have a Mathematics Association whose task will be to organize different activities, *e.g.*, entertainment by numbers and mutual question-answer by two groups, life-history of famous mathematicians, their discoveries, and exhibition of material aids, etc. These associations will help in making the subject interesting.

EVALUATION OF REMEDIAL TEACHING

After remedial teaching, it becomes necessary to evaluate the whole programme objectively, so that its success or failure may be clear. And the teacher gets an additional chance to discover the difficulties of the children and their causes.

For this the teacher can give the tests of the same standard as were given before diagnostic work. If the teacher had given any Standardized Achievement Test at that time, he may give another form of the same test. This will bring the comparative picture (before and after this programme) of the child. It must be mentioned here that during this programme the teacher and the student must get enough time for reformative work.

Before making any change in the programme of remedial teaching, all steps of the programme must be reviewed, so that the limitations may be known. A child whose progress seems to be very slow or insignificant should be sent to a specialized personnel such as a counsellor or the school psychologist.

In spite of what has been said above it seems necesary to make it clear that, like all teaching, remedial teaching is also an art which can be learnt only through actual use. It needs an individual approval to teaching and an interest in students as individuals, both of which mean alertness, understanding and sympathy on the part of the teacher.

APPENDIX

A. Standardized Achievement Tests

1. California Arithmetic Tests. The California Test Bureau, 5916, Hollywood Blvd., Los Angeles 28, California, U.S.A.
2. Jamia-Millia Arithmetic Test. Jamia Millia, Delhi.
3. Hoshin, S.M. : Scholastic Attainment Test, Ganit No. 2. State Bureau of Educational & Vocational Guidance, Patna, Bihar.
4. Lee-Clark Arithmetic Fundametals Test. The California Test Bureau, 5916, Hollywood Blvd., Los Angeles 28, California, U.S.A.
5. Stanford Arithmetic Tests. The World Book Company, Yonkerson-Hudson, New York, U.S.A.

B. Diagnostic Tests

1. Arithmetic Diagnostic Test. Manovigyan Shala, Allahabad, U.P.
2. Brueckner Diagnostic Arithmetic Tests. Educational Test Bureau, Minneapolis, Minnesota, U.S.A.
3. Buswall-John Diagnostic Test for Fundamental Processes in Arithmetic. The Public School Publishing Company, Bloomington, Illinois, U.S.A.
4. Schonell's Diagnostic Arithmetic Tests. Oliver & Boyd, London, U.K.
5. Wilson Inventory and Diagnostic Test in Arithmetic. The Plamer Company, 370, Atlantic Avenue, Boston, Massachusetts, U.S.A.

C. Practice Material

1. F. J. Schonell : *Practice in Basic Arithmetic.* Oliver & Boyd, London, U.K.
2. A.E. Congdon and R.B. Thompson : *Remedial Arithmetic for High Schoo' Pupils.* Lincoln, Nobraska, University of Nobraska, U.S.A.
3. Schonell : Practice Cards in Basic Arithmethic. (20 Cards).
4. P.B. Knight, J.W. Studebaker and Gladys Tate : *Self-Help Arithmetic Workbooks.* Scott Foresman & Company, Chicago, U.S.A.
5. Wilson : *100 Per Cent Arithmetic Drill Books.* The Macmillan Co., New York, U.S.A.
6. Text-Books on Arithmetic.

9

Value Oriented Programmes in Schools—A Plea for Moral Education

Dayal Saran Verma

'MORALS' AND IMMEDIATELY one finds someone get up and exclaim, "What a subject to talk about! The world has gone much ahead of such superstitions and prejudices" as if the world has gone ahead, if at all it has, without morals. This talk of 'going ahead', *i.e.*, of progress, itself involves a moral principle, in whatever form one conceives it, and hence the sceptic contradicts himself. But the sceptic is not altogether wrong, for in his mind is associated with 'morals' a lot of bunkum dealt with by a political leader keeping the press in view, or a pompous harangue by a theatrical religious preacher making the whole business of morality a ridiculous formality or a matter of evening recreation. This psychological association is so deep in the sceptic that he considers all talk of morality to be tall talk. The educator, however, has to deal with this problem, because qua educator he cannot ignore morals; neither can he ignore the sceptic who will not compromise with any perfunctory enforcement of formalities.

But the sceptic has further objections and they seem to be fundamental and more serious in nature. You cannot teach morals without having to do anything with religions, because "in religion morality has not only found its sanction, but its fundamental reason for being[1]." And the sceptic may argue that with religion we bring into education sectarian dogmas, rituals and the anti-rational verbiage of fanaticism.[2] Unfortunately the sceptic has much truth on his side. In the name of religion man has perpetrated the worst of atrocities, destroyed cities and civilizations, exploited nations and races, crucified, guillotined and shot dead the best personalities produced by humanity. Still in the form of 'Philosophia Perennis', as Huxley[3] calls it, religion has been the greatest source of cohesion, co-operation and progress. Had there been no religion, it is difficult to understand what other source would have been

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1. Urban, W.M. : *Fundamentals of Ethics* p. 26. (London 1949).
2. Russell, B.opposes religious education and it is worthwhile to look into his arguments. They can be summarized as follows : (1) Religion is a conservative force and preserves much of what was bad in the past; (2) insofar as religion makes its appeal to fear it is lowering to human dignity ; (3) Loss of faith is a quite probable occurrence and it is impudent to base all morality, even the indispensable minimum, upon a foundation likely to give way ; (4) it underestimates the intellectual virtues. See his book *Education and the Social Order* ; Ch. VIII. (London, 1956).
3. Huxley, A. : *The Perennial Philosophy*, p. 1 (1947).

with man to give him the wider perspective and feeling of oneness, which he still possesses. Remove all religious personalities from the cultural history of mankind and this great ant-hill of human beings becomes meaningless, with no purpose of its own. Hence the sceptic's objection is an objection in desperation. Throw the baby as well with the bath-water, he seems to suggest.

Do away with religions, their sectarian values, if you can ; but how can you do away *with religion* itself, which is the source of the habitual vision of greatness, so necessary, according to Whitehead,[4] for any moral education? One redeems himself in religion by contemplative sharing of the redemption of humanity from slavery, bigotry, ritualism, etc., by the great religious leaders like Moses, Buddha, Jesus, Gandhi. What is necessary is to find the relevance of these lives in resolving the value-crisis of modern life.

The sceptic, however, is not pacified, for he still possesses one more high velocity bullet in his arsenal against moral education. "All right, have moral education if we must have it", he would say, "but, remember, we can impart it only if we are moral ; and since we are not, let us start our programme of moral education with ourselves." The implication is obvious : unless we are all angels we cannot make the boys angels and since we are not, the moral education we impart must remain but a will-o-the-wisp. The implication can be rebutted easily. Surely if we are not completely moral, we are not totally immoral either, and so let us start with whatever good we have in us. In so doing we are not simply carrying out the professional responsibility which we shoulder by virtue of being teachers, but we also give an outlet to the best in us and thus measure our creative and moral potentialities with the actual. The sceptic is not, I may add, really an opponent of moral education ; what he is up against is its perversions, its formal and hypocritical application to the problems of life. He wants to see morality in the very business of school life and not as a subject with a separate syllabus to be taught by the teachers employed separately for it. In this respect the sceptic definitely scores a point.

While rejecting some prevalent arguments against moral education, one should also see the inherent weakness of the traditionally accepted instructional programme of moral education. Traditionally the programme consists of the direct instruction in such moral precepts as 'Speak the truth', 'Honesty is the best policy,' 'Be kind to others', 'Love thy neighbour', etc. Children are made to read stories in which virtue is always rewarded and vice is always punished. These precepts are used sometimes as chief decorations on school walls (chief spoilers, I should say, because they never serve any purpose by hanging on the walls. Sometimes there are so many of them on those walls, hanging or painted, that they grotesquely spoil the otherwise beautiful small building of the school). The difficulty with our practical life is that virtue is not always rewarded nor is vice always punished. In the same way the moral precepts are also not applicable in any absolute sense. For example, after attending an ill-organized, weary evening party, no one would like to tell the otherwise hospitable host that the party has been bore. 'Speak the truth' cannot guide us here. The artificiality of direct instruction of these precepts is so revealing that no sooner do the children learn these precepts than they learn their inapplicability to prectical life also. This in the long run promotes in them a more perfunctory attitude to these precepts than they would otherwise have acquired. As educational agencies schools are concerned more with the behaviour pattern of students than with precepts and so, abstracted from life and the mode of adjustment with society and its members, as they occur in formal instruction, they remain nothing but dogmas devoid of all educational value. Rarely have I seen a school having some definite programme or technique which inculcates and fosters in children the behaviour pattern which follows from these moral precepts. The problem is not national but international, and its echo can be heard in the voice of the American sociologist, P. Sorokin, who said that "schools breed egoists rather than altruists. Virtually the only devices for moulding character, various sports, competitions, prizes, etc., are based on an explicitly competitive principle, animated by the ethos of rivalry, by the spirit of subduing one's rivals in football, oratorial contests and the like. There is little competition in humility, sacrifice, social service, and so forth."[5] I do not necessarily ask for special competitions devised for rivalry in humility, sacrifice, etc., as Sorokin seems to suggest. What I plead for is a fundamental change in the attitude of the educators and in their methods of organizing curricular and extra-curricular instructional programmes in schools. We can give a more purposive direction to all learning, whether it is in natural sciences or in humanities, and we can devise ways and means that all learning, n schools at least, is permeated with the values cherished by the nation and humanity.

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[4] *Dialogues of Alfred North Whitehead.* Ed. Lucien Price, p. 244 (Mentor Book, 1956).

In the context of what has been said above it seems clear that the title of this paper, 'Value-oriented Programmes in Schools' is not high-sounding but hits upon the fundamental truth regarding instruction in morals. It means that no programme in school is educationally significant if it does not provide children with an opportunity of having a living experience of moral life and if it does not encourage them to have that experience. Truth, honesty, helpfulness, initiative, team-work, etc., are best exemplified in experience and fortunately the school is a place where innumerable opportunities for such experiences can be provided. For example, I sometimes wonder whether the 'keep silence' policy adopted in classrooms has any real value. Can this rare opportunity of finding so many children together in the classroom not also be utilized for some more meaningful purposes besides imparting instruction ? An imaginative teacher would surely like to change the method of his classroom teaching a little if he finds that he can by such change make the lesson a cooperative venture—cooperative not only with the teacher, but among the children themselves as well—and, thus, give them an opportunity for having an experience in helpfulness and 'Loving thy neighbour'. We all have had sad experiences of seeing how some of the young are brilliant in academic achievements but absolutely self-centred, unhelpful and arrogant in manners. Had they studied in value-oriented classes, where cooperation and helpfulness had been a mode of learning, they would probably not have developed such undesirable personality traits.

Among the many causes of indiscipline seen in schools today, the lack of value-orientation of school programmes must be counted as an important one. The discipline we develop or want to develop in students by the traditional authoritarian method is not value-oriented, because they do not learn it as a necessary mode of a happy life, as a self-discipline. They accept it because they have been compelled to accept it through the principle of reward and punishment, with the result that they do not 'discipline' but 'reward' becomes a value and whenever there are chances of the inapplicability of this principle, as in a crowd, we find them pursuing the value of fun, *i.e.*, hooliganism. In a class where children learn discipline as value, *i e.*, its relevance to their success in learning or in social interaction, they are disciplined in the absence of the teacher as well, and then they grow up, in the absence of any authority whatsoever. It is not possible to go into details of the causes of indisciple in this paper but it can safely be said that we cannot expect anything better from students whom we have kept huddled together in huge numbers in shabby, small classrooms as passive listners to day-long lectures and instructions imparted to them under an authoritarian administration, and whom we have never given an opportunity for realizing their own creative potential.

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[5] *The Reconstruction of Humanity.* P. Sorokin. p. 138 (Bombay, 1962).

Value-oriented programmes in schools do not require much change in the school routine, they require an absolute change in method. A value-oriented science teacher would not simply impart science lessons but see that the students organize themselves in a project to see for themselves through the lives of Copernicus, Galileo, Newton, Madame Curie, Darwin, etc., how much truth-seeking perseverence is required to add even a modicum of truth to the existing fund of knowledge. A social science teacher will not simply impart lessons in civic behaviour and history but will see that he creates in students a genuine sense of belonging and identification with the community. The mental science teacher will not simply impart formal lessons in right thinking but will make children learn right thinking as a living experience and its effectiveness in group behaviour. The same can be said regarding aesthetic values and the teaching of art and literature. To this can be added extra-curricular activities, festivals and birth-day celebrations, school anniversaries, etc., organized in a value-oriented way.[6]

It would be a contradiction in terms if activities considered as value-oriented are catalogued here. Only the teacher on the spot can decide as to which aspect of his lesson can effectively be transformed into value-oriented activity. It, however, seems necessary that the teacher is consciously acquainted with the principles which go to make an activity value-oriented. They, in my opinion, should be called the cardinal principles and can be enumerated as follows :

(1) A programme is value-oriented if it makes possible the learning of a value as a living experience

The principle rejects the efficacy of all formal instruction in morals and goodness. The sense of good and bad is already there in the child when he comes to the school. The school as a selective agency is responsible for associating the sense of goodness with the proper stimuli and to rekindle this sense in a concrete situation as many times as is possible. The principle is based philosophically on G. E. Moore's position that the notion of 'good' cannot be explained by definitions. "My point," he says "is that 'good' is a simple notion, just as 'yellow' is a simple notion ; that just as you cannot, by any manner of means, explain to anyone who does not already know it, what yellow is so you cannot explain what good is".[7]

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[6] Reference must be made in this connection to the Basant Project, organized by the teachers of a school in New Delhi, in which during the five-week Basant celebrations the school became 'a hive of purposeful creative activity'. It is difficult to summarize the achievements of the Project here, but. to some extent, it serves as an example of value-oriented activity. For the report on the project see *Teacher Education*, Quarterly ; Vol. IX ; No. 4 ; (DEPSE, New Delhi ; April, 1965).

(2) A programme is value-oriented if it has been organized in a democratic way

No programme can make value a living experience unless children have a sense of 'participation' and 'sharing' in the whole of the programme, unless they are emotionally involved in the values of the programme. Only the democratic technique of proposal, discussion, adoption and appraisal by children can develop in them this emotional involvement in the whole of the programme. Not only this, the technique itself is a training in the values of initiative and teamwork. It is in group discussions and groupwork that children learn self-discipline, self-direction and self-evaluation and it is in group-discussions and group-work only that children learn the habit of reasoned obedience to a democratically constituted authority. For an educator, sociableness, cooperation and healthy competition are not merely philosophical concepts ; they are, for him, the mode of desirable behaviour and hence the organization of a value-oriented programme must begin with the values of social life.

(3) A programme is value-oriented if it helps every child in the realization of his productive-creative self

There is nothing metaphysical in the principle. To realize oneself is to realize the creative potentiality of oneself in practice. It is the realization of what one may be as also of what one should be. From the educational point of view this realization always centres on some creative activity. It is only in action that creative energies can release themselves, and it is only in action that the individual finds the fulfilment of his aspirations in a concrete way. In a strange, mysterious way the past learning and future aspirations of an individual meet in his actions. The principle lays emphasis on the fact that we are dealing not with the child in general but with the child in particular. In whatever categories we try to classify children, the classification must remain artificial, for individuality is unique and intrinsically valuable. This leads us to the fact that the individual must be allowed to participate in the programme in his unique way. An efficacious value-oriented programme can provide this opportunity of participation in a unique way only if its activities are centred on some broad-based productive and creative activities.[8]

Morals, as the above principles clearly indicate, are cultivated in the social intercourse, in creative activity and in living them again and again. In school, the teacher has to create conditions which make this cultivation possible and in this sense his responsibility increases. He cannot now withdraw himself into his self-conceited satisfaction as the traditional moral instructor does, after giving his moral discourse. He is required to acquaint himself with fairly up-to-date researches in psychology and education, for these researches have the same relation with teaching as the researches in physiology and medicine have with the treatment. How would one like to be treated by an apparently modern doctor using outmoded methods of treatment ? One has a horror of these quacks. But in education the quackery continues, because probably the people are not much interested, or because the harm that the wrong methods do is slow and imperceptible or because people cannot afford the cost of the new methods. This, of course, does not mitigate the horror of this fact that most teachers, after getting their degree in education, not only do not like to add anything to their store of knowledge, but fall back on the old methods of imparting knowledge. It is not simply the teacher who is to be held responsible for it. The language and the medium in which these researches are carried on and published are almost always beyond the comprehension and reach of a primary or high school teacher or headmaster. It seems that nobody in India seems to be very particular about the dissemination of knowledge thus gathered. Research reports are indeed nothing but a heap of paper and research institutes are but luxury-gardens in this poor nation if the teachers who work with the grass roots of the Indian democracy do not get regularly in their hands the conclusions of these researches in a language they are able to understand.

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[7] *Principia Ethica*. p.7, (Cambridge, 1962).

[8] Julian Huxley in his book *On Living In A Revolution*, p. 194 (London 1944) has observed, "The problem of getting rid of undesirable repressions (and distorted sense of morality) can also be attacked by specific methods.Of these, the method of encouraging self-expression through creative activity which is both free and self-disciplined is probably the most important". I should like to add that creative activity, if it is not productive and socially useful, may lead to escapism, which is nothing but the distorted sense of morality. Hence my insistence on the word productive.

10

Help the Pupil to Think for Himself

C. Padmanabhan

'STANDARDS have gone down' is a statement often found in the reports of the examiners at all levels,—the high school examinations, the university examinations and the examinations of the Public Service Commissions. The statement is refuted by some educationists. But what is the real state of affairs? It is generally true that the usual methods of classroom teaching do not provide opportunities for the pupil to think for himself. If only the members of the teaching profession make up their minds to modify their methods a little and provide greater opportunities for the pupils to do something that may be considered original, it would help to create in them the right way of acquiring knowledge. The pupil is treated as a store house of knowledge and much is pumped in but the pupil should observe, learn and express himself, so that he develops the right attitude to acquire the knowledge.

Experiments have proved that it is possible to adopt such techniques in the classroom for almost all the subjects of the curriculum. Demonstration lessons were given by the author of this essay in many of the schools inspected by him during the period of his service as District Educational Officer. Groups of pupils quite new to the author who had been attuned to different spoon-feeding methods were able to give off their best during such demonstration lessons. The correct approach, stimulating the young minds to think for themselves brought in the correct response and their teachers were able to observe the ability of some of their own pupils whom they had perhaps considered as backward.

An attempt is made in this essay to outline some of the methods with illustrations that could be easily adopted in the general classroom.

Languages

In the language class very few teachers follow methods which will develop the language sense in the pupil. Greater emphasis is laid on the subject-matter than on the language—perhaps not being aware that it is the means to an end. The use of the language—for expression and comprehension – should be the aim of language teaching, while the information given in the lesson should be treated as a by-product.

The study of words and phrases in their contexts and their use in similar or other situations should be given the first place. Words and phrases are best understood when explained to them by a gesture or a situation or a diagram or by illustration. This type of understanding encourages them to use the word or phrase in a similar situation.

Let us take the word 'sigh'. The dictionary equivalent does not in any way impress the pupil. If the teacher demonstrates it as 'a sigh of joy' or 'a sigh of relief' or 'a sigh of sorrow' or 'dissatisfaction' with relevant gestures the correct use of the word in the proper context is understood and the pupil can express himself correctly, if similar contexts are suggested by the teacher, *e.g.*, 'I got news of a prize in the lottery' or 'my dad is returning from the battlefield' to help the pupil to use 'a sigh of joy'; or 'I just finished my examination' or 'there was nothing serious about my brother's accident' for the pupil to use 'a sigh of relief' and so on. The use of 'too—to' is so common. The pupils could master it if only right situations are given. The teacher attempts to touch the ceiling and uses the expression 'The ceiling is too high for me to touch' and adds that 'the ceiling is so high that I cannot touch it' and says that 'I am not tall enough to touch it'. Don't you feel that these three different forms of expression could be easily grasped by the pupil? The expressions are fixed by further drill. The teacher attempts to lift a table nearby and says that it is very heavy and asks the boy to use the three different forms.

You will be surprised to find that even backward pupils respond to such situations and you will find them using the correct expression, 'The table is too heavy for the teacher to lift'; 'The table is so heavy that the teacher cannot lift it'; 'the teacher is not strong enough to lift the table'. The experiment may be tried and you will be astonished at the way in which correct sentences with the apt use of the phrases are spoken by the pupils.

More difficult expressions like 'would rather' and 'had better' can easily be understood by pupils from apt illustrations and used correctly by them when suitable contexts are provided by the teacher.

The procedure is indicated below:

1. Recently there have been some air crashes; I have to go to England. My mother says, 'I would rather he went by steamer'. My father says, 'you had better go by steamer'.
2. There have been highway robberies. The women feel doubtful whether they could go out with their jewels on. 'We would rather we went without jewels'. The elders in the group advise them that they had better go without jewels.

Similar contexts provided by the teacher would help pupils to use the two expressions freely in their own sentences, *e.g.*, it is raining—their home is near—whether to walk home or to take shelter under a tree is to be decided. One says '...' and the other '......'.

It will be seen that the above methods of teaching the language build up the vocabulary and the language sense and there is free and correct use of the language in similar situations.

Picture composition, charts neatly and clearly drawn with certain definite aims for language practice will serve best to help pupils to think and build up their own sentences with the vocabulary acquired. Much thought should, therefore, be bestowed in the preparation of the pictures and how they could be used for the application of the expressions or sentence-forms learnt.

The English Reader or textbook should contain short pieces selected from standard authors using the essential forms of language structure for understanding, practice and acquisition. Intensive language work could be done with such small extracts. The teacher should be able to use the extract to the best advantage of the pupil by a detailed study of all the forms of structure and usage available in it. Perhaps, Robb's *The Way to English*, Readers published by Orient Longmans provide such passages for language study. The anxiety of the teacher to repeat sentence forms himself or to din into pupils such structures would not produce such great results as a few sentences constructed by the pupils themselves with their own words and expression to suit the situations.

It is not possible to discuss this aspect in fuller detail within the limit of this small essay. An indication, however, of the possibility of such an approach and its beneficial results has been attempted.

Mathematics

In mathematics most of the time is spent by the teacher in working out model sums without effective treatment of the first principles. The basic truths and facts and the skills necessary need to be dealt with in the proper manner before models are worked out. Pupils are not allowed time even to analyse a problem and sift the data to help them to work up to the result required.

Decimals is the most important topic now, as the basis for manipulation with all the units in the metric system. Teachers should devote their full attention to the proper understanding of its bases and its application to the metric tables. Pupils should grasp that decimals are the normal continuation of the number system and place value of digits. It would be then easy to elicit the place value of the digits in decimals which in turn would lead to a proper understanding of the decimal place. Subsequently, the change in the place value of digits consequent on multiplication by ten and powers of ten could be elicited. Once the pupils have a clear concept of the decimal system, all calculations with the metric units will be intelligible.

Practical work and out-door work help pupils to have the right concept, *e.g.*, of area and perimeter. If you make pupils walk round the football field or the badminton court, a correct idea of perimeter is got and he builds up the value of the perimeter as $2(l+b)$. Thirty-six pieces of cardboard, each one centimeter square, could be arranged side by side in 9 rows of 4 each or 6 rows of 6 each or 3 rows of 12 each or 2 rows of 18 each and the method of finding the area of the rectangle (length × breadth) could be elicited; incidentally the pupils observe the space occupied as against the length in the perimeter.

Most of the skills are acquired only by doing and pupils should be given special training in measuring angles in different positions and in the drawing of straight lines parallel to one another. Any topic in geometry which needs these two skills should be started only after assuring that the pupils know how to measure an angle or to draw a straight line parallel to another.

Mental work, with easy examples based on the first principles would help the proper grasp of fundamentals. Mental work also helps in achievement or as diagnostic tests. A wise teacher would make adequate use of mental work for helping pupils to think. Special training is necessary for acquiring the art of framing mental sums.

An illustration of the method of helping pupils to think for themselves and the use of mental work for necessary drill is given here. A rectangular sheet of cardboard 22 cm by 15 cm. is taken and rounded so that the breadthwise ends meet. The pupil sees the cylinder formed. The pupil finds that the area of the cardboard is the area of the lateral surface of the cylinder. He also observes, when it is repeatedly opened and reformed that the length of the rectangle has become the circumference of the base and the height of the cylinder is the breadth of the cardboard.

Mental questions giving the circumference of the base and the height could first be given to find the area of the curved surface. Later the radius may be given to calulate the circumference of the base and then the height so as to help them to find the lateral surface and inverse problems on the same principle to find the circumference of the base or the height given the area and one of the former and even the radius.

Pupils should be trained to read problems and to find out if data required is available in the sum for finding out the required result or to use the available data suitably for the required application to arrive at the result.

Science

One or two illustrations are attempted below to help the pupils to observe and draw their own inferences, thus helping them to think in the classroom.

A pulley is shown to the pupils and they are asked to say where they had seen such a device used and the pupils jump up to say that they are used in wells, in cranes, for signal wires by the sides of the railway line and so on. It is so easy to elicit the purpose for which they are used. Perhaps helping them to use their brain in this way would be the right method. Practical work, demonstrating the crowbar to raise a boulder, using a smaller stone or to shift the boulder by fixing its point below the boulder and moving it by rotary movement, will help the pupil to observe the position of the fulcrum, the load and the power and draw inferences.

Experiments should be performed drawing the attention of the pupils at every stage or they should be given instructions for the performance of such experiments and to draw the inferences. Such a practical approach is not in common practice in most of the institutions and hence we find pupils learning by rote certain facts and not being in a position to apply them intelligently when required.

Conclusion

It is, therefore, possible for the teacher to help the pupil to think for himself in the classroom. Perhaps the day is not far off when such methods will be followed by our teachers in the interest of the future generation. This kind of a treatment of the topics of curriculum can be effectively implemented only if the teacher has thorough knowledge of the subject, has powers of observation, and thoughtfully plans effective and intelligent methods of elicitation. Co-operation of teachers handling the same subjects in the classroom in group thinking on effective methods would serve the purpose and in a few years we will have a set of people who could use their minds on problems before them.

11

The Teaching of Spelling in Hindi

Sohan Lal Patni

SPELLING IS THE source of language. Language with appropriate words, becomes a powerful medium of expression. In a literary fashion it can be said that 'word' is Goddess 'Parvati' and the sense it conveys is God 'Shiva'. Words put in their correct forms create a pretty 'Kailash' of literature. Words are formed by the fusion of vowels and consonants which are the symbols of various ideas. We cannot think of words without vowels and consonants, for without them there can be no true expression—for example, '*Kamal*' (Lotus) and '*Kalam*' (Pen). By a simple disorder of consonants, the true meaning of a word is distorted. The same can be said about the utility of vowels if vowels are placed disorderly the meaning totally changes; for example 'जाति' (Caste) and 'जाती' (going). In '*Jati*' and '*Jatee*' there are vowels 'इ' and 'ई' respectively, but if 'इ' is used in place of 'ई', what a great change in the meaning is brought! It is therefore, in the fitness of things if proper alphabets are used in words. The words with proper alphabets are termed as 'spellings'. The teaching of language is the teaching of spellings in their proper forms and its teaching therefore, is the part and parcel of grammer teaching.

The teaching of 'spelling' is imparted in three ways :

1. Through pronunciation,
2. Through written work,
3. Teaching of principles through charts.

1. The teaching of spelling through pronunciation

The spelling mistakes can be improved considerably through correct pronunciation. A teacher of language has a great responsibility when he teaches a language through right pronunciation. A child faces difficulty at the primary stage because the teacher gives him lessons orally. For this, a lauguage-teacher must have a thorough knowledge of its phonetics, pronunciation and word formation. In the teaching of Hindi, for instance, the teacher will explain to the taught the minute difference of pronouncing 'इ' and 'ई'. When spoken, 'इ' has a less stress while 'ई' has more. Similarly, the vowels 'उ' and 'ऊ' can be taught correctly through the right pronunciation. The teaching of phonetics plays an important role in the teaching of a language more particularly Hindi. Unfortunately, at the primary stage, there is neither proper teaching personnel nor adequate equipment for imparting knowledge of right type of pronunciation. If a teacher, wholeheartedly devotes himself for administering right type of training in pronunciation, the ears of the taught are well-trained to grasp the right sort of words, but the major hurdle in the teaching of correct pronunciation is the poor teaching personnel, unaware of the nature of words and modern teaching methods.

At the secondary stage, a student has to learn many more things, so he is not benefited in this sphere. If the foundation is weak, the building standing on it will necessarily crack. It is needless to say that the true knowledge of pronunciation should be imparted to the taught at the early stage.

2. The spelling teaching through written work

It is true that right and faultless words reveal their true sense. For this, a thorough practice of writing correct words is very necessary. For instance, if a child writes 'पीढ़ीत' instead of 'पीड़ित' the teacher instructs him to write this word again and again. If a student writes that word for ten times, he will have a practice of writing the word correctly. This method of writing correct words is full of many a drawback. The first and the foremost defect of this method is the lack of generalization. This method, without a true knowledge of the principles of word formation leads a student nowhere only one or two mistakes can be corrected by this method. A student, though learns to write a few words correctly by this method, yet he will have no basic knowledge of writing correct words of similar forms. There are many similar words, but their spellings are different, so a student is liable to make mistakes in the absence of proper knowledge of word formation. It is, therefore, crystal clear that the knowledge of 'functional grammar' is essential for learning spellings. If proper charts, indicating general rules of word formation are used, the instruction in spellings can be given with good results.

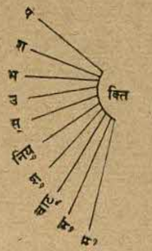
3. The teaching of principles through charts

For the teaching of principles and grammar of spellings, various illustrative aids and charts are used. This sort of teaching is practical as well as psychological. A child learns thoroughly and easily through charts which attract him due to 'Law of Association'.

The classification of Words of Hindi language : The teaching of spellings requires a thorough knowledge of various kinds of words. For this, the classification of words is necessary. A language is formed by various kinds of words derived from different sources. There are four kinds of words in Hindi. They are 'तत्सम' (words of Sanskrit origin), 'तद्भव' (changed forms of 'तत्सम') 'देशज' (country words) and 'विदेशज' (words of foreign origin). In this connection, it is true that the principle which is applied to the words of Sanskrit origin cannot be applied to the other forms of words. Thus, there will be four groups of spellings —of 'तत्सम' words, of 'तद्भव' words, of 'देशज' or country words and of 'विदेशज' or the words of foreign origin. It is apparent that students write incorrectly the two types of words, *i.e.*, the words of Sanskrit origin or तत्सम and the words of foreign origin 'विदेशज'. These two forms of words can be taught with success through proper charts depicting the principles in an interesting way. There are exceptions also which should be indicated in those charts side by side to avoid confusion.

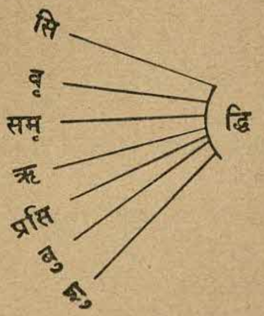
Some educationists opine that language teaching, particularly spelling-teaching cannot be imparted through charts for there are no set-rules. No strict principles are followed in a language. Language is formed by various usages, and convenient speech of peoples, therefore, *principly* speaking, no language or words can be taught by strictly following the principles for there are exceptions too. In this connection, I emphatically say that a good method should not be dropped owing to exceptions. A thorough training of principles of spellings can be given through various charts indicating various rules and regulations together with various exceptions. In this sphere, I have made a few experiments which have brought excellent results. I took a project of spellings for the Class VIII students with success. First of all, I gave a dictation of a chapter in four paragraphs to the students of Class VIII. After checking, I noted down some common mistakes. Then I prepared charts of correct words illustrating principles in them. Those charts were put in the class room without any previous notice. As the charts were put at their proper places, they attracted the students. Consequently, they read them and unconsciously they learnt the correct words. It is interesting to note that the students were not informed that there would be a test again. The 'spelling charts' were displayed for a fortnight in the classroom. As they were attractive, the students threw a casual glance at them. After a fortnight, the charts were removed away. Then the students were given a dictation again. The results were exceptionally fine. Nearly 80 per cent students wrote correct words. Nothing succeeds like success. The better results of these charts are undisputable. The following are the illustrations which were depicted in the charts.

The words of Sanskrit origin or 'तत्सम'.
Illustration—1.



1. पंक्ति
2. शक्ति
3. भक्ति
4. उक्ति
5. सूक्ति
6. नियुक्ति
7. शुक्ति
8. चादुक्ति
9. भुक्ति
10. मुक्ति

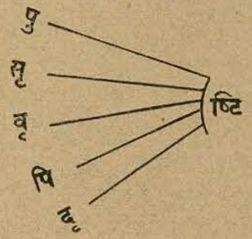
Principle—The words with compound consonant 'क्त' will always have vowel 'ि'.
Illustration—2.



1. सिद्धि
2. वृद्धि
3. समृद्धि
4. ऋद्धि
5. प्रसिद्धि
6. बुद्धि
7. शुद्धि

Principle—Compound consonant 'द्ध' will have 'ि' vowel.

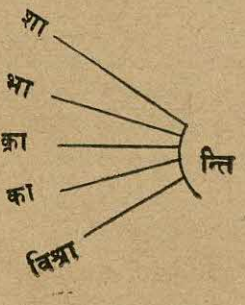
Illustration—3.



1. पुष्टि
2. सृष्टि
3. वृष्टि
4. पिष्टि
5. दृष्टि

Principle—The compound consonant 'ष्ट' will always have 'ि' vowel.

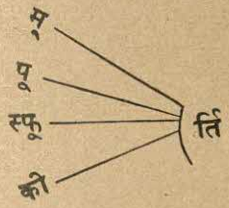
Illustration—4.



1. शान्ति
2. भ्रान्ति
3. क्रान्ति
4. कान्ति
5. विश्रान्ति

Principle—The compound consonant 'न्त' (NTA) will always have 'इ' vowel. Exception—'दमयन्ती'.

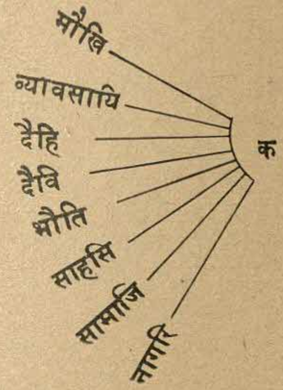
Illustration—5.



1. मूर्ति
2. पूर्ति
3. स्फूर्ति
4. कीर्ति

Principle—The compound alphabets र्त (RTA) will have 'इ' vowel.

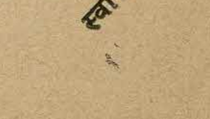
Illustration—6.



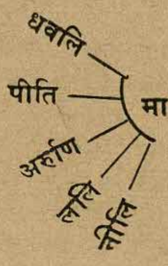
1. मौखिक
2. व्यावसायिक
3. दैहिक
4. दैविक
5. भौतिक
6. साहसिक
7. सामाजिक
8. नागरिक

Principle—The words sounding 'इक' (IKA) in the end will have vowel 'इ'.

Illustration—7.



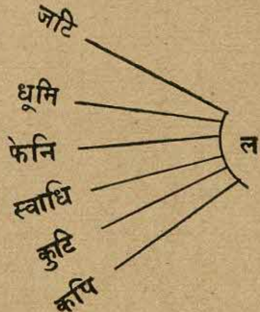
1. धवलिम
2. रक्तिम
3. अरुणिम
4. बंकिम
5. स्वर्णिम



1. धवलिमा
2. पीतिमा
3. अरुणिमा
4. लालिमा
5. नीलिमा

Principle—The words sounding 'इम' and 'इमा' in the end will always be spelt with vowel 'इ'.

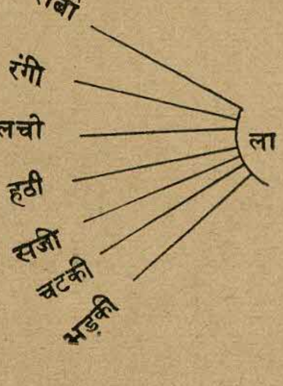
Illustration—8.



1. जटिल
2. धूमिल
3. फेनिल
4. स्वाधिल
5. कुटिल
6. कपिल

Principle—The words of Sanskrit origin ending with 'इल' will be spelt with vowel 'इ'.

Illustration—9.



1. रौबीला
2. रंगीला
3. लचीला
4. हठीला
5. सजीला
6. चटकीला
7. भड़कीला

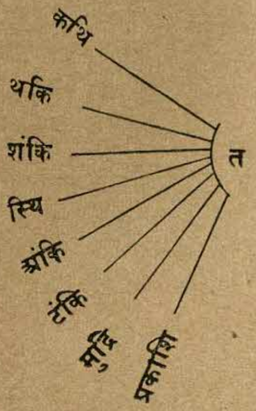
Words of foreign language 'विदेशज'—Urdu words.

Principle—The Urdu words with 'इला' sound in the end will have vowel 'ई' and not 'इ'.

Note—It should be made clear to the students through different charts put side by side that Hindi words of Sanskrit origin with 'इल and इला' sounds in the end will be spelt with sound 'इ' but Urdu words of same sound will be spelt with 'ई' in the end.

A few more examples of the words of Sanskrit origin.

Illustration—10.

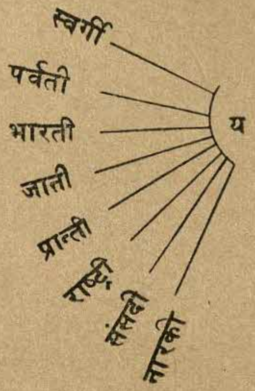


1. कथित
2. थकित
3. शंकित
4. स्थित
5. अंकित
6. टंकित
7. मुद्रित
8. प्रकाशित

Principle—The words of Sanskrit origin sounding 'इत' in the end will as a rule be spelt with vowel 'इ'.

Exceptions—The words 'पुनीत' and 'नवनीत' are of different types, so the above rule is not applicable to them.

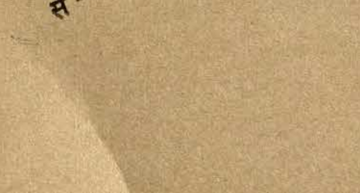
Illustration—11.



1. स्वर्गीय
2. पर्वतीय
3. भारतीय
4. जातीय
5. प्रान्तीय
6. राष्ट्रीय
7. संसदीय
8. नारकीय

Principle—The words sounding 'ईय' in the end will have 'ई' and not 'इ' as their vowels.

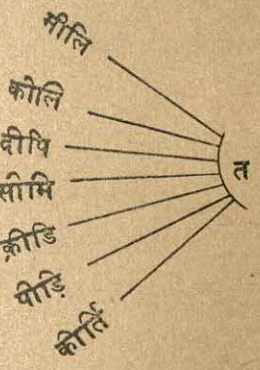
Illustration—12.



1. संहारिणी
2. विहारिणी
3. कार्यकारिणी
4. अधिकारिणी
5. प्रचारिणी
6. संचारिणी

Principle—The words which have double 'इ' following one after another in the end will be spelt with 'इ' and 'ई' respectively.

Illustration—13.

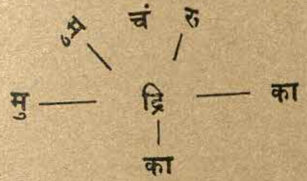


1. मीलित
2. कीलित
3. दीपित
4. सीमित
5. क्रीड़ित
6. पीड़ित
7. कीर्तित

Principle—If in the beginning of a word there are two 'इ' vowels, then the former 'ई' will be spelt as 'ई' while the latter as 'इ'.

Exceptions—The words 'लिखित' and निन्दित are of different kinds, so this rule does not apply to them.

Illustration—14.



1. चन्द्रिका
2. मुद्रिका
3. रुद्रिका

These charts prepared with personal and practical experience have shown a good result. Students can be benefitted immensely by these charts if properly used.

Besides the above kind of words, the words ending with 'इ' and 'उ' in singular forms change in the plural forms. This can be explained clearly through the charts. The singular words having 'ई' and 'ऊ' in the end change into 'इ' and 'उ' in their plural forms.

Illustration—15.

A Vowel

इ की मात्रा

एक वचन	बहुवचन
चींटी	चींटियाँ
चिड़ी	चिड़ियाँ
धोती	धोतियाँ
टोपी	टोपियाँ

B Vowel

उ की मात्रा

भालू	भालुओं
उल्लू	उल्लूओं
पहलू	पहलुओं

The words having 'इ' and 'उ' in their singular forms do not change their vowels 'इ' and 'उ' in the plural forms.

Illustration—16.

	एकवचन	बहुवचन
इ.	पति	पतियों
	गति	गतियों
उ.	पशु	पशुओं
	शत्रु	शत्रुओं

On the basis of experiments conducted by me these projects in spellings have brought better results. It will be convenient if charts are exhibited in two units consisting of six illustrations each. When I exhibited the first unit, the students were not aware of their purpose, yet eighty per cent students wrote correct spellings with the help of these charts. At the second display of the unit the students were well acquainted with their aim, so the result was much better. It is my considered opinion that while displaying the charts, the students may be explained well the aim of their exhibition. It will considerably help in the teaching of correct spellings. As Hindi is our national language, much useful work is to be done to enrich it. It is possible only by a rich fund of words which help in the expression. If the words are not used in their correct forms, this language, the necklace of mother India—cannot be a powerful medium of expression. Even the people of non-Hindi speaking States of India are learning this national language with interest and enthusiasm. It is, therefore, necessary that the training in spellings with proper rules and regulations is regarded as the dire need of the day. A greater responsibility lies on the shoulders of Hindi teachers who should leave no stone unturned to popularize this language and its literature by making its study interesting through attractive charts and illustrative aids displaying the general principles which can be grasped easily.

12

Improved Method of Teaching Science in Secondary School

G. R. Shanthappa

SCIENCE IN TODAY'S classroom needs to face the demands of parents, the society, the changing system of education and the ever-active school children. It requires the teacher to teach it with great zeal and, of course, not to be just always syllabus-centered. Four years ago there were only five students who offered science and today with the method which I introduced to teach science, there are about ninety-six students who have taken science as their elective subject. To prove this statement, let us in imagination visit my classroom.

We enter not through the front door as an ordinary visitor would, nor via the emergency entrance, but we go in through the side door, so to speak—the entrance used by the workers. Our specific interest is improved method of teaching of science. The teaching is phased in the following manner: (1) Atmosphere created to make the student relax and enjoy learning. (2) Specific aims in mind to teach science in this modern world. (3) Teaching with the help of aids. (4) Methods of motivation. (5) Evaluation. As soon as we enter, we see that the room is Lecture-cum-Practical Class. There is one board at one end, with a small rectangular table used as a demonstration table, some white and coloured chalks along with a duster in a box is placed at one end of the table. Another small table, very close to this is used as a teacher's desk with a few flowers arranged by the students in a flask. By this they learn the names of the plants on the school campus.

Also on the table some textbooks, reference books, books used in Summer Institutes are placed in a book-rack. The teacher and the students freely use these books. Opposite to this arrangement is a museum cupboard, the other two sides have windows, which keep the room airy and well lighted. The inner walls are occupied by beautiful pictures collected by the students and charts made by the pupils are also on display. On one side of the room the first window has a small acquarium, made by the students, the next window has a biscuit box with cactus growing in it, the third window has a collection of worms and the fourth one has a small cage with couple of house sparrows.

The observation table occupies the space between the third and the fourth window. Here we see one of the students, she reaches out for a book, opens it carefully, compares what she sees on the strip before her, finally satisfied, she puts the book away, turns to write "Sixth day—still pupa stage" ; what follows takes several minutes. Finished at last, she looks towards us with a smile and asks what we want. "This is my project", she says. Would you like to look around and see what we do in science class ? We accept the invitation and follow her.

Aims of improved methods of teaching science

1. To give information related to Vocational, Practical, Intellectual and Social fields.
2. To help the pupils to be aware of the impact of science and technology on their natural surroundings and on society.
3. To get acquainted with scientific methods which enable man to acquire an intellectual grasp on these phenomena and put them to use for the benefit and comfor of human society.
4. To make them understand about the method and attitudes about scientists, to get training in correct judgment, to have an open mind, and to be ready to acquire knowledge.
5. Use of sufficient science materials to enable the pupils to obtain an appreciation of variety of living and non-living things.
6. As cell is the basis of life, reference is often made to this topic.
7. To encourage reference work.
8. To be useful citizen.

Experimental period

During this period of three months, efforts were made to create interest in science by arranging field trips, nature walks, laboratory exercises, invitation to enquiry, exhibition, guest speakers, showing of science films and blocks, for example—gardening, making of simple apparatus for the use of junior students, etc.

Time-table

Each class gets four periods of 45 minutes each in a week. The periods are divided into :

(1) *Theory classes*—Topics from prescribed syllabus are taught wherever possible introducing the new theories.

(2) *Practical Type A*—Practical work prescribed in the syllabus. *Type B*—Practical work from laboratory manuals used in the Summer Institutes, mostly team-work, to encourage group work and to save time. At times some experiments are demonstrated to keep the students amused and to hold their interest.

(3) *Library*—The books are issued only for the senior-most class, the other classes get too if the pupils get high second or first class marks in their monthly reports, and once in a while all the students get time off to read library books during the class time. They are allowed to read the books if they have finished the class work, or when at times some students go away for extra curricular activities practice, the other students get a treat to use the books.

(4) *Invitation to enquiry*—The whole class is allowed to take part, teacher acting merely as a guide all the time with a view to encouraging critical thinking and spirit of enquiry. This method is excellent for training the mind of our future budding scientists. At present *Biology Teachers' Hand Book* by Schwat is used as a reference book. These classes have improved in the power of logical reasoning by getting training in the power of observation. The pupils write better answers in theory as well as in practical papers. The backward children try to come out of their shells to take part in the discussion. The pupils who are poor at sketching seem to enjoy it more, as they now think science is just not always writing the answers with large labelled diagrams but needs thought-provoking questions and answers. The average and the above average scholars have a good chance to add more knowledge to their brains.

(5) *Problem session*—Each squad, usually

house-wise, selects a topic, collects the material, discusses and reports the general idea to the whole class.

(6) *Hat talks*—Each student picks up a topic from a fancy hat, and he prepares a three minute paper, the time given for preparation being one week.

(7) *Table talks*—The teacher acts as a leader, the students discuss experiments, projects, field trips, hobbies, science, general knowledge and all this encourages close teacher-pupil relationship.

(8) *Drawing session*—This is a ten minute drawing session. The students are asked to practise certain drawings at home, *e.g.*, appartus for preparation of oxygen or structure of heart. The assignment is given one week ahead. In this class, they are asked to sketch, only ten minutes are allowed for each drawing. This has helped the students to draw accurate, well labelled drawings without wasting much time.

(9) *Time-table session*—Assignments are announced one week in advance, so that students know what to expect in the coming week. This helps them to be better prepared for the classes.

Methods used for motivation

(1) *Inter-class beautifying competition.* Cleaning the science room and making charts for the annual inter-class beautification competition.

(2) *Observation table.* Students put their experiments or anything which they have collected on the school campus or at home or during their excursions, or sometimes parents and friends of the school send some articles or specimens, these too are displayed on this table. If a student desires to observe anything, for example, caterpillar, she puts it on this table, for the child knows no one will touch without permission and her property is quite safe. A slate is hung on the wall just above the observation table, on this the children write down what they have put on the table so that others can observe and learn too.

(3) *Books table.* In one of the corners on the desk some books and science magazines are placed. They are changed once in fifteen days. The students are allowed to read these whenever they are free, as the classroom is open during all the hours of the school.

(4) *Science magazine. The Link* is published once a month. The class representatives collect the articles, the editorial board arrange them in order, the student art director designs a cover, and this is hung outside the science room so that the students can get hold of it whenever they want. Even after school hours they can have a glimpse of it.

(5) *Hobbies in science.* This chart shows the different kinds of hobbies in science.

(6) *Vocational guidance chart.* This guidance chart tells the pupils, why they should study science, what science can do for them and career opportunities in the city and in our country.

(7) *Science club.* The above-average and those who are interested to do something more always get a chance to fulfil their desires.

(8) *Project race and achievement chart.* A chart showing names of every pupil in different classes is put up inside the classroom. The columns are filled with the name of the pupil, the name of the project, and the other three spaces marked, start, halfway and finish, according to their progress. The class house leader puts a tick mark on the chart. At one glance the teacher knows where each pupil stands. Below the list of the project race, achievement list is put up. Here the names of the pupils and the monthly grades are entered by the teacher. This also helps the

teacher at once to know as to who is working and who needs extra help in the class.

(9) *Science fair*. The science fair is named 'Fun-o-Rama'. The spotlight of the fair this year was 'Science in Every-day Life'—ideas were taken from books used in science Summer Institute. The topics for the fair are divided into eight groups, so that the students get an idea what they are expected to do. The items are as follows :

(1) Experiments
(2) Working or Static models
(3) Demonstrations
(4) Preservation
(5) Charts
(6) Debate
(7) Essays, and
(8) Improvised apparatus.

The models and charts are always insisted to be made from materials found locally, for example, from plaster of Paris, old newspaper, brown paper, papier mache, cotton, wood, or thread. Usually, the fair is held on Parents' Day. The students explain their display to the keen visitors and friends of the school. The selected items are sent up to the regional science fare.

(10) *Exhibition room*. This is a store-room with built-in cupboards, the rest of the room being used for displaying selected charts and projects made by classes, *e.g.*, poultry—the deep litter system, how we catch diseases, the coal mine, animals of the past. This room is an effort to combine study and pleasure.

(11) *Field trips*. As out-of-station-trips are quite expensive, as far as possible the places outside the city are avoided. Usually suggestions for walking-distance places are taken up, *e.g.*, a visit to circus, poultry, flower show, industrial estate, lake side, dairy, museum sections in the local colleges.

(12) *Films*. On alternate Saturdays, films are borrowed from the Summer Institute. They are lent free of charge.

(13) *Our corner*. Just as we come out of the science room, outside on the wall a jute cloth piece is nailed. Here the students put up their articles, paper-cuttings, or some interesting findings.

(14) *World science news*. A small bulletin board gives news of world science news, found in the daily papers, one of the classes is in charge of this section.

(15) *Garden*. The students design and grow plants which are specially used for their lessons, and some are supplied to the art section who in return are over-obliging to print the names of the plants.

(16) *Sense of patriotism*. Latest trend in gardening is 'Grow More Vegetables' and 'Non-Cereal Meal'.

(17) *Social service*. The students enjoy the science classes so much that they want to help others who cannot afford to enjoy just as they do. So they help an orphan school, they buy pictures for their picture reference library, pay seniors for the annual flower show, and invite them for exhibitions and films.

(18) A watch word 'WATCH' is put upon the museum cupboard which means watch your words, actions, thoughts, character, health and home work.

(19) Other items to be introduced : Science general knowledge competition, first-aid course, symposium, speakers to be invited from different fields of science.

Methods of evaluation

(1) *Essay type and objective type* is given for monthly tests. For final examination, the question paper is set exactly on the style of final board examination.

(2) For half yearly examination, every student has to submit a booklet, usually made after referring to a topic in a magazine, or a reference book which is too expensive to be bought for the library. These booklets are added to the collection of science library books. This year about 150 booklets were made.

(3) *Science record.* Every science practical journal on the inner side of the cover has an envelope stuck in which a sheet of paper marked 'science record' is kept. The sections are marked for name, class, date, class work, home work, outstanding work, books (means if they bring books to the class or not), punctuality. Accordingly, every fortnight the teacher puts down the grades in the sections, S—for satisfactory, U.S.—for unsatisfactory and O—for outstanding. This record is signed by the parent or guardian.

(4) *Daily practical and written assignments.* Grade A for superb, B for good, C for poor but for monthly and annual reports the grades are changed to marks. This method the students appreciate as the science work is graded differently than other school subjects.

(5) *Projects.* A week before the home final examination, every science student is asked to submit his project. Ten marks are kept aside for this.

The 'thank you' notes. Parents and students always seem to be sending in some interesting information or books or other objects as gifts to the science room. A "thank you" note, as soon as possible is despatched by the science Captain. This act has been much appreciated and no wonder in return we get more gifts.

Effect of improved method of teaching

(1) The students look forward to the class.

(2) Some have set up their own science laboratory.

(3) More students for Science Talent Search Test.

(4) Sportive spirit to take part in the fairs not just for the sake of a prize but for fun's sake.

(5) The correct technique in the use of apparatus results in practical work being done quickly, neatly and systematically.

(6) More prizes in the regional fair.

(7) Better school results.

The best compliment of the year given by a visitor was 'I can actually see some one working'. The year has been the happiest, fullest and the rarest.

13

Teaching of Mathematics

P. G. Vaidya

'Mathematics is the Queen of all the Sciences'

WE SHOULD BE proud of mathematics, the queen of all the sciences, but it is found that many of us hate her. Most of the students and common men dislike mathematics. Let us see what are the reasons for this hatred. I feel that this hatred is due to the persons who do not introduce the 'Queen' in the right spirit. They proceed to introduce her without any living interest and make it appear a burden, whereas if taught properly, it would be a pleasant exercise. The 'dry side' as it is often called is stressed at the cost of the students' interest. That is why the average students have no affinity for mathematics. The real nature and use of mathematics are not clearly understood by many even among the educated classes. To them, mathematics is nothing but a manipulation of certain mysterious symbols and diagrams, understood and understandable only by an equally mysterious set of human beings, who call themselves mathematicians. Usually lectures on mathematics are dry and we never see smiling faces in a mathematics classroom. A mathematics teacher is always associated with a cane and dry teaching. He is usually unpopular amongst students.

The most important aspect of teaching of any subject is to create interest in the subject and to maintain it. Once the interest is lost, however good the method of teaching may be or however good the teacher may be, it is all a waste. If mathematics is not taught properly in elementary stages, all efforts to improve it in higher standards are usually found to be useless. To create and maintain the interest in mathematics, some techniques are followed by me and I put these for consideration of all. These techniques are the outcome of my teaching experience for the last ten years. I have practised these methods and it is found that the students who have no special aptitude for mathematics learning are eager to learn and anxious to attend the mathematics period.

It is needless to say that in any class, all students do not have the same intellectual calibre or the grasp. The teacher, if he is aware of this, will have with him a variety of methods, to make the unintelligent understand without making the intelligent starve.

I used to make use of the following techniques while teaching mathematics. The discussion is restricted to the Classes VIII to XI.

1. Construction of problems.
2. History of mathematics.
3. Puzzles.
4. Recreational mathematics.
5. Fallacies.

6. Cuts in calculations.
7. Relation of mathematics with day-to-day life.
8. Observation and comparison.

1. Construction of problems

One of the reasons of dislike for mathematics is the fear complex about the subject. To get rid of this complex, the students should be able to solve problems ; this will make them take interest in the subject. This is the most fundamental part of the laws of learning. This interest can be created among the students by asking the students first to construct the problems and then to solve these. When the students master this technique of construction of problems, thereby they get the idea of the anatomy of the problem which helps the students to analyse the problems and solve them. If this is introduced with every unit, the students will cultivate the habit of construction of problems ; which in its turn, will develop in them the power of analysis in solving problems, not necessarily resricted to mathematics.

Now, I shall illustrate this technique by taking a unit $a^2 - b^2 = (a-b)(a+b)$ from algebra. I tried this in Class IX and the results were astonishing.

I introduced the factors of $a^2 - b^2$ by the usual method, worked some problems for illustration. After this, instead of directly working problems from the book, I taught the students how to construct problems.

I asked the students to tell me different terms one by one. The different terms told by the students were — 5, x, $y/3$, x/y ab, c, -3...... and so on. Then I asked the students to tell me the squares of these terms.

25, x^2, $y^2/9$, x^2/y^2, a^2b^2, c^2, 9...and so on. Then I asked them to choose any two squares and subtract one from the other. Some of the examples constructed with the help of the students were :

$x^2 - 9$, $x^2 - a^2b^2$, $y^2/9 - c^2$...... and so on. Then I asked the students to work out these examples. After this I asked the students to construct independently the problems of the same type. It was found that the students constructed the problems which were even more difficult than the problems given in the book. After this I introduced the students to exercises in the book. The students felt that the examples in the book were similar, sometimes easier than those they constructed. This created in them the confidence that whatever was given in the book was not so difficult. Such examples can also be constructed by them. This helped them to get rid of their fear complex about the subject. Constructiveness is one of the basic urges in man. That is why the students must have taken interest in constructing problems. I asked the students to prepare a book of problems constructed by them. The students take pride in becoming authors of books.

I continued the procedure as follows :

I wrote the example $x^2 - y^2$ on the board and replaced x by $a + 1$. The example became $(a + 1)^2 - y^2$. Simplifying this we get $a^2 + 2a + 1 - y^2$. Thus constructed a problem with the help of the students and then I started solving the same. Usually we start analysing the problems, *i.e.*, we ask what we have to find out here. How will you proceed ? ......and so on. It was found that no analysis was necessary. The students learn the analysis while constructing the problems. Then I constructed 3 more problems and solved those on the board with the help of the students. I asked the students to construct the problems independently and solve these. Slowly I went on increasing the degree of difficulty of the problems.

$$\begin{aligned}(x+5)^2-4 &= x^2+10x+25-4\\ &= x^2+10x+21\end{aligned}$$

When I asked the students to factorize $x^2+10x+21$, I found that it was not necessary to explain any thing. The students could very easily understand why and how to split 21 to 25 — 4. The necessary analysis was learnt by the students while constructing the problems and knowledge gained in this way was retained for a longer time.

The assignment was ......"Construct the problems of the given type and solve them". Usually, the students are not eager to do the assignments in mathematics. But in this case it was found that there was a sort of competition to construct the harder problems and the students were eager to show their problems to me. It was found that the students took initiative in working and learnt more.

As an illustration, I have explained the method by taking one unit from algebra. It can be applied to other topics in algebra and geometry.

I was encouraged by the results of this method of teaching and I undertook this 'Construction of Problems' as a project to evaluate statistically the gain that this method ensures as compared with the routine or traditional methods.

Experimental Project

Title. Drilling in algebra through construction of examples by the students of Std. IX.

Aims and Objectives

To test whether the drilling through construction of problems helps the students (A1) to solve the problems effectively, (A2) to develop the thinking required for the analysis of the problem.

Procedure. The students of Std. IXA and IXB were given an initial test based on their previous knowledge of algebra from Standard VIII. From the scores of this test, the students were divided into two equated groups by making equal the means and standard deviations. One group was called the control group and the other was called the experimental group. In each group, there were twenty-six students. The same teacher was teaching both the classes. The theory was taught to both the groups by the same method. With the control group the drill work was done by the traditional method, *i.e.*, by asking the students to solve the problems from the textbook in the class and some as an assignment. With the experimental group, instead of being asked to solve the problems from the textbook, the students were asked to construct the problems and then to solve them. This was executed as follows:

(1) The teacher explained how to construct a problem and then he solved it. One problem was constructed as an illustration.

(2) The teacher constructed five problems with the help and co-operation of the students and then solved them.

(3) Then the students were asked to construct 5 problems and solve them in the class. The teacher supervised the work.

(4) The assignment was to construct 10 problems and to solve them. The students were asked not to solve the problems from the book.

The unit chosen for this experiment was the factors of a^2-b^2. The unit was divided into sub-units such that each unit required two periods of 35 minutes each. Each sub-unit was completed in a week and a final test common to the two groups was administered.

Evaluation. The nature of the final test common to both the groups was as follows :

(1) The question paper was of 20 marks.
(2) The time limit was 20 minutes.
(3) The question paper contained 5 questions.
(4) Question No. 1 and No. 2 contained drill problems.
(5) Question No. 3 contained modified problems, *i.e.*, one step higher than drill problems. How to solve these modified problems was not taught to either the control or the experimental group.
(6) Questions No. 4 and 5 contained the construction of problems.

The answer papers were examined and the scores of three types of questions were separately recorded for each student.

The experiment is still going on and I present here some of the results available up to this time; only one test is over by this time.

Statistical Information

(1) Mean of drill problems of experimental group—11.5238.
(2) Mean of drill problems of control group—4.0000.
(3) The two means were tested for difference by '*t*' test from statistics and it was found the means differed significantly at .01 level.
(4) Mean of modified problems of experimental group—3.5714.
(5) Mean of modified problems of control group—1.0000.
(6) These means of modified problems of two, control and experimental, groups were tested for *t* and it was found that the difference of means was significant at 0.05 level.

Conclusions

(1) Number of students avoiding home work from experimental group was less than the number of students from control group. This implies that due to natural tendency of constructiveness, the students take initiative in working, *i.e.*, the fear complex about the mathematics has gone.
(2) From result No. (3) of statistical information we have reason to believe that the students are benefitted from practice in the construction of problems as far as drilling is concerned.
(3) From result No. (6) of statistical information, we can say that the thinking required to solve the problems is shown by the students from the experimental group, *i.e.*, they learn how to analyse the problem.

2. History of Mathematics

It is natural that the students may feel to know—who discovered the theorem which is so wonderful? How many years back was it discovered? What led the particular man to discover it? Answers to these questions lead us to the history of mathematics, which is very interesting. Some of the stories about mathematicians and their discoveries are appealing and enchanting. The teacher should have a collection of such information and should use it while teaching. Some of the events from history are also helpful to impress some principles. Here I shall illustrate, how I taught the principle involved in *reductio ad absurdum* proof which is used in geometry.

In this type of proof we assume that whatever we have to prove is incorrect, and further we carry out few steps in geometry and come to some contradiction or an absurd result. Because we come to an absurd result, whatever we have to prove must be correct. This is how we argue and say that the theorem is proved. The difficulty of the students is that they do not agree with arguments because we get the absurd result, whatever we have to prove must be correct. Many teachers do not know the principle involved in this. They follow the method as a mechanism. To satisfy the students I used to tell them a story from the history of mathematics.

Prof. Hardy, a mathematician from England, once gave a dinner party to his friends. Obviously, his friends were mathematicians, economists, philosophers and eminent professors of different subjects. While talking with the friends, Prof. Hardy made a statement that, *if you assume any wrong result, any wrong conclusion can be proved from it.* This statement astonished many of those present in the party. None but one professor of economics dared to challenge this statement: "If your statement is correct, you should be able to prove the problem which I ask you. Assume that $2\times2=5$ and show that yourself and myself are the same as the 'Mayor of the city.' Most of those present, felt that Prof. Hardy would not be able to solve this problem. Prof. Hardy said, "Well, this is quite trivial. Here is the solution:

$2\times2=5$ ...... (1) Assumed wrong result.
$2\times2=4$ ...... (2) Known correct result.
From (1) and (2) we get, $5=4$.

Now, subtract 3 from both sides and this gives us $5-3=4-3$, *i.e.*, $2=1$. This means two persons, yourself and myself, are equal to one person, the Mayor of the city.

Now, it is clear that, the principle involved in the *reductio ad absurdum* proof is that, if we assume a wrong result, however correct you may be in dealing with further operations the final result is bound to be a wrong one. Thus in geometry, we assumed whatever we have to prove as incorrect and worked out every step correctly and come to wrong result. Since all operations are correctly used, the only reason for the contradiction is that our assumption must be wrong.

I found that the above story was very effective in fixing the principle of *reductio ad absurdum* proof—and the students used the principle correctly. There are so many such stories in the history of mathematics which a teacher should use to fix or emphasize certain principles. Students also enjoy such stories and they take interest in the subject. The biographies of mathematicians also serve the same purpose. I found that the biography of Late Ramanujan, a great mathematician, is most inspiring and the students liked it very much.

A teacher should, in my opinion, lose no opportunity of bringing to the notice of the students and emphasizing the contribution of Indians to mathematics. Though the present knowledge has come to us from the west, the teacher must significantly show our share in it. This will make any Indian student feel proud and it will fill him with some pride. It will also help to remove from his mind the misconception that Indians cannot advance in this field.

3. Puzzles

Puzzles are liked by all. Especially, students like them more. They hunt for the solution in all possible ways. They go mad after it. Some students take it as a challenge. Solving puzzles makes the students think in many ways. The students try it in different possible ways and at last they get the solution. Even though the last method gives the solution, the earlier attempts are not useless. Earlier attempts may be useless with regard to a particular problem but the same thinking or reasoning process may be useful with some other problems. This develops the thinking ability of the students. It is the last straw that breaks the back of a camel! Even though it is true, every strain has its share in breaking. Solving puzzles is a real learning. It cultivates the habit of thinking and reasoning from different angles along with the recreation.

Find three numbers such that their sum as well as the product should be the same. The answer is 1, 2, 3. $1+2+3=6$ and $1\times2\times3=6$. Before getting the solution, the students give different trials. There they study some other interesting properties of numbers. The puzzles on geometry are more interesting and they increase the constructive imagination of the students, *e.g.*, form a square by cutting once a rectangle of 16 cms. by 9 cms. and joining the two cut portions.

The solution to this problem is a very good exercise in constructive imagination. It is rather difficult to get a solution immediately. The student will have to struggle for the solution in different ways—and this is learning. The diagram given below provides hints for the solution.

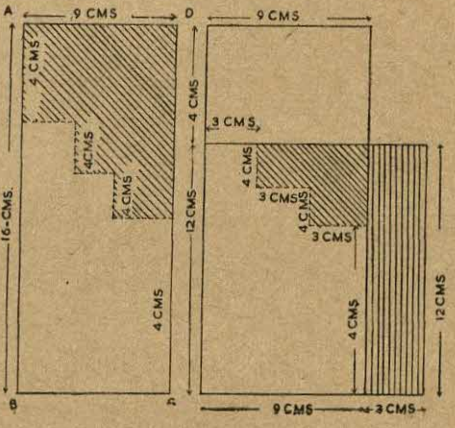
So many puzzles are available in different books. Teachers should have a collection of good puzzles and use them at proper stages.

4. Recreational mathematics

The topic needs no special introduction. I revert to my original argument that mathematics is not taught in an interesting way. The use of recreational mathematics helps in a number of ways. Sadly the material that is available is in English and most of the students are either unaware of it or unable to enjoy it. We have shifted to the regional language as the medium of instruction. It is most necessary that the books on this topic should be brought out in regional languages. A school library should have a section devoted to books of this type. Reading of such books helps to get rid of the prejudice about the so-called dryness of mathematics.

5. Fallacies

Mathematics is a science of laws and rules. Rules should be strictly followed. A wrong idea may be often exposed more



The figures are self-explanatory, hence the detaits of the solution are not given.

convincingly by following its absurd conclusions than by merely denouncing the error and starting again. I shall illustrate here, how certain principles can be fixed in the minds of students through the fallacies.

(1) $x=a$ ....data.

Multiply both sides by x, we get $x^2=ax$.

Subtract a^2 from both sides, we get

$x^2-a^2=ax-a^2$

$\therefore (x-a)(x+a)=a(x-a)$.

Divide both sides by $x-a$, we have

$x+a=a$ But $x=a$

$\therefore a+a=a$. or $2a=a$

$\therefore 2=1$.

Obviously $2=1$ is an absurd result. This absurd result has occurred because at some step some law of mathematics is violated.

Finding faults makes the students think critically about the laws used at every step. The students inspect each and every operation and every time check whether laws are used correctly. This is a sort of revision of the laws as applied in solving a particular problem. Merely committing the laws to memory is of no use. They should be used properly. The application of the laws is more important.

In the above case the fallacy is in dividing by

$x-a, \because x=a, \therefore x-a=0$

Division by zero is not practicable in mathematics. This rule is violated and hence the absurd result. In many problems in algebra, we have to cancel a common factor from both sides. This we can do, provided it is a non-zero factor.

(2) $x=z$ ...(1)

$y=z$ ...(2)

$\therefore$ From (1) and (2) we get, $x=y$.

Similarly,

Man is an animal ...(3)

Donkey is an animal ...(4)

$\therefore$ From (3) and (4) we get,

man is a donkey.

Such fallacies should be collected and constructed to emphasize a particular principle. Finding the solution of fallacies is recreation and also learning.

6. Cuts in calculations

This is another attraction for students. Cut should not be taught separately but should be used in calculations while solving problems and there the method of short cut should be explained. Here are some of these :

(1) $253213 \times 11 = 253213 \times (10+1)$

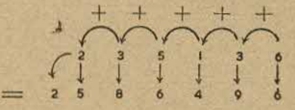
$= 253213 \times 10 + 253213 \times 1$

$= 2532130$

$+ 253213$

$= 2785343$

The general rule to multiply by 11 is obvious. Retain the last digit and go on adding every digit on right to the digit on the left.



$\times 11$

$= 235136 \times 11.$

(2) How to square numbers ending with 5.

Method : Write down the square of 5. Then to the left of it write the product of the number to the left of 5 and its next higher integer, *e.g.*,

$15^2=(2\times 1)\ (25)=225$

$25^2=(3\times 2)\ (25)=625$

$35^2=(4\times 3)\ (25)=1225$

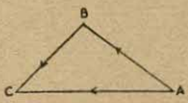
$105^2=(11\times 10)(25)=11025$

The teacher should ask the students to find the proof. As an illustration, I have explained two cuts only, in fact there are so many such methods.

7. Relation of mathematics with day-to-day life

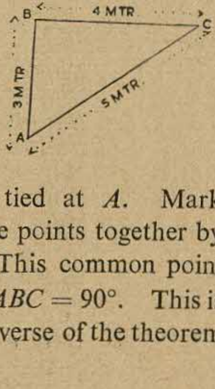
The relation of arithmetic with day-today life is obvious. The difficulty arises mainly in case of algebra and geometry. The students feel, "Where in Life, do I require factors of $a^2 - b^2$? What is the use of sum of two sides greater than the remaining side ? For what am I learning this ?" Of course, one answer is that, it is the foundation of higher mathematics which is more useful. But if the teacher can establish some relation between mathematics and life the students will work with more faith in it and they will also try to apply it in day-to-day life. The value of knowledge lies in its application.

Some illustrations



(*i*) X goes from A to C by the path $A - B - C$, while Y goes from A to C directly. Which of the paths is shorter and why ? In any triangle sum of two sides is greater than the third, the path AC is shorter. If we observe carefully, we shall find that such short cuts are used on the roads by us. When our school was out for an excursion, the students observed this and pointed out the short cuts to me.

(*ii*) For a game of *Kabbadi*, a rectangular ground is to be marked with white chalk-powder. How to draw an accurate right angle with the help of the string only ?



Fix two pegs at A and B such that $AB = 3$ meters. Then tie one end of the string at A and the other end at B. Measure 4 meters along the string tied at B and metres along the string tied at A. Mark these points. Bring these points together by the string keeping tight. This common point is the point C and angle $ABC = 90°$. This is the application of the converse of the theorem of Pythagorus – as $5^2 = 3^2 + 4^2$.

This method is always used by engineers at the time of lay-out of the plot.

(*iii*) Multiply 99 by 101.

$$\begin{aligned} 99 \times 101 &= (100 - 1) \times (100 + 1) \\ &= 100^2 - 1^2 = 10000 - 1 \\ &= 9999. \end{aligned}$$

The teachers should hunt for similar applications of algebra and geometry which will help him to make their teaching lively.

8. Observation and comparison

Observation and comparison is the most important step in mathematics. Usually teachers do not stress this step or mention it specifically. Actually all the steps in mathematics are the outcome of this process. The students must be taught how to observe and compare. It is one of the most vital steps in thinking and reasoning. In many problems mere observation and comparison can give the idea about the solution of the problem.

"A method of solution is perfect, if we can foresee from the start, and even prove, that following that method we shall attain our aim." (*Leibnitz* : Opuscules, p. 161.)

The habit of forecasting the solution should be cultivated among the students. Forecasts are based on observation, comparison and experience.

Illustration : This is an illustration from higher mathematics trigonometry for Standard XI.

Show that

$$\frac{1 + \tan A}{1 - \tan A} = \frac{\cot A + 1}{\cot A - 1}$$

Here, the first step is, observe L.H.S. and R.H.S. carefully. Find out what is the difference between the two. The obvious difference is that L.H.S. is in tan A while R.H.S. is in terms of cot A. If we convert tan A from L.H.S. in terms of cot A, we expect to get the solution. Here, by mere observation and comparison we have forecast the method of solution. This can be applied to many other topics also. After every step the student should compare the result achieved with R.H.S. and then proceed ahead. In many problems full method of solution can be anticipated.

These are some of the aspects which a teacher must take into account while teaching to make his subject loving and easy to understand. I must not fail to warn that the above aspects are not detached topics but they are to be included in a process and an organic one. These aspects must be embodied in teaching mathematics by which I mean that these aspects are a means to an end. These aspects are a part of teaching and should not be the subject by themselves. Due to shortage of space, it was not possible for me to include more illustrations. A good teacher can proceed in the light of the illustrations.

To make use of the techniques discussed above, the teacher must be well equipped and for the preparation, I suggest a few publications :

Journals

(1) *The Mathematics Tecaher* (India), S.I.T.U. Colony, Madras-28.

(2) *The Mathematics Student* : Indian Mathematical Society.

(3) *The Mathematics Seminar*, Bharti Bhavan, Nai Sarak, Delhi.

(4) *The American Mathematical Monthly* American Mathematical Society, U.S.A.

(5) *The Mathematics Gazette*, G. Bell & Sons, London.

Books

(1) *Men of Mathematics*, Vols. I and II, E.T. Bell. McGraw Hill Book Co., New York.

(2) *The World of Mathematics* (in 4 vols.) Edited by Newman. Simon & Schuster, New York.

(3) *Riddles in Mathematics*. D.J. Northrapp. English University Press.

(4) *How to Solve It*? G. Polya. Princeton University Press.

(5) *Mathematics, Queen and Servant of Science* : E.T. Bell. G. Bell & Sons, London.

In mathematics there is a beauty. It is the duty of a teacher to put forth before the students this beauty. Mathematics is more an art than a science.

I conclude this discussion with a quotation :

"Mathematics has beauties of its own—a symmetry and proportion in its results, lack of superfluity, an exact adaptation of means to ends, which is exceedingly remarkable and to be found elsewhere only in the works of the greatest beauty. It was a felicitious expresson of Goethie's to call a noble cathedral 'frozen music' but it might even better be called 'petrified mathematics.' The beauties of mathematics of simplicity, of symmetry, of completeness can and should be exemplified even to young children, when this subject is properly and concretely presented, the mental emotion should be that of enjoyment of beauty, not that of repulsion from the ugly and the unpleasant."

14

Religion in Schools

R. Rama Krishnan

To THE SUPERFICIAL thinker the very theme of this composition may appear to be untenable, incongruous. Religion, he may say, is all right in temples and churches, in feeble assemblies of retired folk with one foot in the grave, in gatherings of sentimentally pious women who are more emotional than rational, but to talk of religion and schools in the same breath is the height of unreality and unwisdom, for it is linking two things with nothing common between them. To try to bring together the quietism, passivity and do-nothingness of religion and schools which are, or must be, lively institutions of virile young folk, itching for activity and doing, to try to connect the blind acceptance of religion with the daring, doubting and bold debating and the unceasing experimenting which constitute the essence of the process of education. This, he will argue, is unreasonable and stupid, mischievous and ruinous. And his stand and position are not without support and sanction from high quarters. The Constitution has wisely declared our State to be a Secular State : we have no State religion as such, and what is the State but the governmental wing of society, and schools but the very foundation of society ? How then can we have any religion in schools unless we wish to be untrue to ourselves and do violence to the Constitution which we have given to ourselves ? Is ours to become a theocratic State in this enlightened twentieth century ? In this age of science and superscience, are we to feed our children and the citizens of tomorrow on myths and fancies, on the wild guesses and fantastic theories which make religion ? The Indian nation is not Hindu or Islamic or Christian, it is Indian and nothing else. That we enjoy religious freedom is no doubt true, but are schools, which are public institutions in which pupils from families professing different faiths gather, the right places for imparting any religious instructions ? So not only from the point of view of the professed atheists to whom all religion is the devil's work, but also from the standpoint of the ardently religious, 'no religion in schools' would appear to be a wiser national policy than any religion in schools. Religion may be good or bad, beneficial or pernicious, but it is entirely the field of voluntary agencies to promote it or to undermine it. Schools have nothing to do with religion, and for schools to try to harbour religion is to invite discord and seek trouble. Religion will in the end strike at the root of education Schools will be undoing themselves by giving an asylum to religion. The school's fundamental task is to teach, not to preach. The three R's (reading, writing and arithmetic) cannot afford to have a fourth R (religion) added to them. This is the stand of quite a vast number of people these days. And at first sight their stand appears to be reasonable, incontrovertible.

But on deeper thinking the position taken up by the vast number will easily reveal its weakness. Much of the argument indulged in by the vast number who will banish religion from the classroom is based on a total misconception of terms and concepts. No clarity of vision, no soundness in reasoning can be expected from people who have loose ideas on the terms they use. Now, what is religion ? And what are schools ? Religion often means one thing to one man, and quite another thing to another man. To a few, religion immediately suggests the scheming professional priest—who in fact is the least religious among mortals, for he is a man who trades on the beliefs and sentiments of people. Religion to him is plain business, an occupation, a money-bringer, and if there are people who are willing to entrust their souls to scheming priests and hope to purchase heaven with a few dollars, well, it is their folly, and they get what they deserve. The priest is the worst black-marketer. And priestcraft is no more religion than bad composing, faulty printing and incompetent proof-reading constitute authorship. To yet others religion means mythology, or rituals It has been well said that there are three parts in religion, *viz.*, mythology, ritual and philosophy. Myths are stories, and stories are for child-brains, and we do not lack for rhyme or reason in stories, though they have their value. Aesop's fables are not history, and we do not prize them for their veracity. All the same these fables are interesting and useful not merely to children, but also to grown-ups. Fables are fables however, and no more. The exaggerations and improbabilities found in them have to be tolerated. Rituals are just sketching and mapping ; a map is not the country proper, but yet maps help learning ; sketches are not the things they stand for but yet help us to know something of them. So mythology and ritual have to be kept in their legitimate spheres, but to many they are the whole stuff and the very soul of religion. To a few others, religion is the religious organization. And the church is Christ, the temple is God, the Sangha is Buddha. There is much truth in the saying that the Church is the body of Christ, for it is the physical and tangible expression, the executive, the working limb of the Christ-spirit. An organization is very necessary for the preservation and propagation of any religion and is, therefore, worthy of reverence. And yet as this universe has in everything its two sides, the bright and the dark, an organization for all the goodness of its motive and its method also contains evil and is in constant need of cleansing and pruning. When it is dust-laden it is a menace to society and in that condition has to be fought against, though vested interests come to the support of the festering organization. But religion is no more sect and society than the body is the soul or the textbook is education or the laboratory is science. We may have excellent education without a textbook, high class science without a test-tube, the best schooling without a building—just under the tree. Textbooks and test-tubes are praiseworthy aids, but aids are not the essence, and an organization or an order is a useful adjunct, not the very soul of religion. So people whose minds get stuck in the organization do not ascend to the limpid spaces of pure religion, but the round and round in the mire of religious organization. Those who would shun any association of religion with schools often have their own truncated conception of the function and purpose of religion and, therefore, see nothing good in keeping the windows of schools open to the breeze of religion. They see a lot of superstition and unreason in religion, but the fact is that it is their defective vision and their imperfect grasp that are the greatest superstition. It is a case of the brinjal-seller appraising the diamond at just a few kilograms of brinjal !

What then is religion? In the words of the illustrious Swami Vivekananda :

> Each soul is potentially divine.
>
> The goal is to manifest this divine within, by controlling nature, external and internal.
>
> Do this either by work, or worship, or psychic control, or philosophy, by one or more, or all of these—and be free.
>
> This is the whole of religion. Doctrines, or dogmas, or rituals, or books, or temples, or forms are but secondary details.

A grander or a more universal concept of religion cannot be thought of. According to the Swami, therefore, no man can, by the very constitution of his being, cut himself from religion. He can no more be sans religion than he can be sans himself. An irreligious man is therefore a contradiction. "I shall have nothing to do with religion" is simply another way of saying "I shall have nothing to do with myself."

And what are schools ? They are homes of education. And man is an educable entity. He needs to be educated if he is to attain maturity and full growth. Therefore education (in the words of Swami Vivekananda) is man-making. And as man is no man without religion, schools have a lot to do, with religion. Swami Vivekananda's famous definition of education as the manifestation of the *perfection* already in man and of religion as the manifestation of the *divinity* already in man shows the close relation between education and religion, for perfection and divinity are identical. If, therefore, any one has the right and the duty to teach religion that one is the school and none else. How far indeed is this position from the stand which would drive all religion from the school yard !

As in the case of religion, so in the case of education too there is a lot of loose and clouded thinking about aim and content. And all the difficulties in regard to religion in schools rise from a wrong view of the goal of education and the function of schools. To many people, schools are merely coaching institutes preparing pupils for a career. To others, schools are just information-mongers, or skill-developers, or pass-securers. The worth of schools is judged on the basis of passes secured in a clumsily-conducted, hastily-evaluated, large-scale public examination which provides no scope for the display of genius, original thinking or exceptional attainment. The syllabus and the curriculum are the minimum thinkable, not the maximum possible, and they do not provide any scope for the blossoming of special talents. It is a dull uniformity we see in schools. No plant in the school garden can grow to its natural height and flower in its native way. Everything is shaved down or sought to be pulled up to a prescribed height. Schools are mere doll-making factories, the dolls being rolled out of the same mould. Such schools are soulless and of course need no religion.

True education, therefore, consists in providing the right stimuli for the pupil to build his body, sharpen his intellect, cultivate his mind, develop his God-given special traits and perfect his soul. If anyone of these many aspects is neglected to that extent the education imparted is incomplete, and an incomplete education is worse than no education, even as a half-built house is a danger to the inmates. And as in the scale of values the soul is a million times more than the body, the best part of education must relate to the feeding of the soul. An impoverished soul is a greater tragedy than an impoverished body. If a school without a playground is unthinkable, a school without a soul-ground is equally unthinkable. In one or two telling sentences Vivekananda put the whole position in a nutshell. He said :

> I look upon religion as the innermost core of education.
>
> Religion is as the rice, and everything else, like the curries.

If then religion is the fundamental thing in education, a school to be worthy of its status must provide for religion in its setting. How can this be done ? Already the syllabus is heavy and the teachers overworked and pupils overtaxed. Are we to add another subject to the curriculum ? Are we to hold an examination in religion ? Is the religion of a pupil a thing capable of being evaluated and marked ? All these and a hundred other considerations crop up when we think of accommodating religion in schools. But as is usual in all such cases the difficulties are more imagined than real. For one thing, religion is not so much taught as caught. Religion is more an atmosphere than an instructed or implanted something. It is not so much water artificially poured at the roots as the moisture in the air, not so much manure as fertile earth. Religion is not an affair of this or that period in the time table. It must be the very warp and woof of the school texture. The school must be soaked in it. For anyone in the school there must be no escape from it. It must be to pupils what sunshine is to the creatures inhabiting the earth. It is the sacred task of the teacher to build this atmosphere. He must be one imbued with the spirit of religion. His sense of dedication to work, his sane attitude to life, his right judgement in all things, his healthy approach to the study of problems, his discriminating analysis of all issues, his freedom from prejudice and pettiness, and his attunement to the Cosmic will that governs and directs the universe and every atom in it—all these must be so many windows revealing to pupils the trend and temper of a religious soul. It is the teacher that makes the institution. Every *gurukula* of the old days centred round a Sage or an Acharya, and the *guru* of old was not a mere instructor but an igniter. Not his words, but his way of life constituted his teaching.

Given the right teacher the rest is easy. The highly impressionable young minds cannot but be inspired by the silent but potent personality of the ideal teacher. But in addition to this it is not impossible to work out a syllabus of formal instruction in respect of the world's religions—their founders and their teachings. Religion has influenced mankind more than anything else and a course of world history is highly incomplete without a description of what religion has done for humanity. A Buddha or Christ or Muhammed or Sankara is a far greater maker of history than an Alexander or Caesar or Napoleon or Hitler. And another unforgettable truth is that each of the prophets belongs to all mankind and not to that particular section which goes by his name. The Bible has an appeal transcending the limits of the technically Christian world. So is it with other scriptures. In this age of world-oneness we should not hesitate to feed the Hindu child also on the Bible or the

Christian pupil also on the Dhammapada. Such a feeding will ensure tolerance and harmony, and the U.N. will become more. meaningful and purposeful than it is today, We may go even a step further and say that it must be a matter of pride for a Hindu for instance, to celebrate Christmas, or for a Buddhist to celebrate the nativity of the Gita-Acharya. The seeds of such a mentality must be sown in the schoolyard and if this is done, the next generation of mankind will be a world-community living in generous tolerance and perfect harmony.

The case of religion is the same as that of literature. If I am an ardent student of Kambar or Kalidasa, I shall be only enriching myself if I study Shakespeare or Goethe. My excursion into Shakesperean profundities is not at all a sign of any waning interest in Kambar or Kalidasa. So a Hindu's interest in the Bible must not be taken to mean a coldness to his own scripture, the *Gita*. A good curriculum must enable pupils to be acquainted with the major teachings of all faiths and to be familiar with the contribution to the world's spiritual wealth of all the prophets. One's native faith is of course like mother's milk to the infant. But the growing infant can and does certainly take other food than the mother's milk. This other food is the religions other than one's own.

The poet spoke of the Parliament of Man and the Federation of the World. Nothing can bring about this happy consummation but a training in generous understanding and warm appreciation of all the faiths of the world. The start in this training must be given in schools; it can be given nowhere else.

It is the fashion these days to talk much of the frustration of youth. Why are youths frustrated and lend themselves to indiscipline? School curriculum provide no food for their aspiring souls. They enter schools asking for bread and we give them stone in the shape of a dull, cold, thin course of studies. Is it any wonder that the unsatisfied hunger of the souls of youth takes ugly shapes? The poet said,

The thirst that from the soul doth rise,
Doth ask a drink *divine*.

It is the provision of this drink divine that is the school's basic duty, and it is just this duty that is sadly neglected today in the educational institutions.

And religion of the right sort is that drink divine.

It is the task of education to develop every person into sound citizenship. And citizenship is of two kinds—national and international. The One World idea must be made to have an increasingly powerful hold on man's minds. The old theory of my country right or wrong and the old virtue of national patriotism have to be broadened out into a world loyalty. The solidarity behind the brothers and sisters of a country must develop into a kinship of all humanity. The seed for this expansion of outlook, for this widening of the mental horizon must be sown in young minds in the school. The teacher is the expert gardener in this respect. And the teacher can do this gardening of the soul quite well only if he is impelled by the true religious spirit. It has been said that while religions may be many, Religion is one. It is this Religion that must cover and penetrate the web of education, if education, is to deliver the goods.

The unique nature of the Indian genius is nowhere better brought out than in its designating the school a *vidyalaya*, rather than a mere *pathasala*. A *pathasala* is a shed where lessons are taught, a *vidyalaya* on the other hand is a temple of learning, which implies that education is out and out a religious process. The Acharya is a *deva* (a god) and the pupil a pilgrim and seeker (a *vidyarthi*). And that alone is learning which liberates (*Savidyaya vimuktaye*) ; the soul has to be released from thraldom of all kinds and get re-established in its majesty. And what goes on incessantly in the school yard is *Saraswati Puja*, the adoration of the Goddess of Learning.

How then can there be education without religion any more than there can be life without a soul ?

Therefore in the schools of old it was the practice to start every lesson with an invocation to the Universal Spirit (teacher and pupils chanting the invocation together), and to bring every lesson to a close with a *Santipatha* (*Om Santih, Santih, Santih,*) the word being chanted thrice for emphasis). No wonder teacher-pupil conflicts and violent pupil-behaviour of any sort were then unknown.

If education is life-building, what greater education can be thought of than what is implied in this sublime chant from the *Rigveda*, evidently composed and first uttered by a master-mind ?

Be united ;
Speak in harmony ;
Let your minds apprehend alike ;
Common be your prayer ;
Common be the end of your assembly ;
Common be your resolution ;
Common be your deliberations ;
Alike be your feelings ;
Unified be your hearts ;
Common be your intentions ;
Perfect be your unity.

15

Points to Ponder on Classroom Management

P. M. Ravindran

"WHAT IS YOUR name ?" Shot out a subdued voice. The silence was not long. "No name ?" another voice from nowhere. "No name, yet ?" a doubt from the rear. Sneezing and sniffing rose from the corners.

"I have come for a name from you," was his smiling reply. "Give me one, when you please." They did give him a name in the course of time, the name of admiration and esteem.

This was the acid test a teacher had when he first stepped into a new class. I wish to suggest a few hints on the successful management of a classroom, churned from the field in a span of eleven years. They belong to attitude, action and tactics. I feel that had I learnt them at the scratch, they would have added more glory to more of my children.

(A) ATTITUDE

Cheerfulness cheers up

It is my sincere prayer that I should have a smile on my face in the class, especially as I enter it. For, cheerfulness on my face cheers the whole class and aids learning, while my gloom makes the whole class disinterested and gloomy.

Firmness, but flexible firmness

An incident taught me where to be flexible while being firm. I was rather strict in dissuading pupils from asking leave for portions of the day. I turned down the request of one young boy and forgot it. In the class I found him weeping, and, on enquiry, was told a sad tale which I later confirmed. He had no parents, and was now under the care of his uncle who was coming home that evening from far, and whom he had to receive at the railway station. He described to me the painful treatment he would have for negligence of duty. His swollen eyes next morning proved his words.

Alertness against prejudice

I confess that prejudice sometimes derailed me in the class. An example. Early in my teaching career, I came across a boy of fourteen who would very frequently smile and for no apparent reason. Insult was suspected. I tried to ignore it, but one day, my temper rose so high that the venom found its vent. His face grew gloomy. He stood up, and then steadily advancing towards me said in a tone, sad and low, "Sir, I can't control it. The doctor says there is some incurable disorder with my nerves. Pray, pardon me".

I was taken aback ; impudence turned out to be infirmity of health. I could hardly make up for the thrust I had made.

This incident taught me to analyse the situation and find out the true nature of the case.

Young gentlemen and young ladies

I once heard a boy painfully quote a teacher's words to him. "You can at best be a woodcutter". If I use such words, I can silence an impertinent boy, but I feel that, it is neither discipline nor order, for there is no spontaneous self-collection in him.

One way to be gentle with my pupils, a way suggested by my own teacher, is thinking that I am standing not before young children, but before the promising buds of engineers, doctors, teachers and other craftsmen of tomorrow. As years go by, I have found my own old students walking in bigger shoes and this has sounded caution to me when I sometimes lose my temper in the class and am about to spit out unruly words. This kind of thinking has instilled in me a sort of fear which may be compared to a father's fear of his son that prevents the father from going to the public liquor-tavern, watched by the son. By such thinking, I have mastered more and more self-control before my children and the self-control enables me to control them more easily.

Trust in children has return

I think that class supervision and checking are best done if done informally. Trust in children is important without which supervision goes to sharpen craftiness in the sly. During every period, I go among the pupils three or four times, at least, meanwhile assessing, assisting and appreciating their work. Classroom management is no problem then. The invariable feature I have noticed in these eleven years is that when I am alert and active in the class, my children naturally become active in the way I desire and good discipline ensues.

(B) ACTION

Learning how to learn

I was ignorant of the fact that many of the youngsters under my care did not know the art of learning. To illustrate, when I was explaining the construction of a sentence, some of the pupils were copying the meaning of a word, thus missing the oral instruction. This spoiled the order in the class. Clear instruction on "how to learn" was the remedy. I said, "Stop writing when I want you to listen". I repeat, "learn how to learn, boys, then learning is easy." This has a good result.

Consolidation of head and hands

I was facing a new class. There were boys who called themselves "the privileged uncles" and were known for villainy and craftiness. Doubting, in my heart of hearts, whether I could command the discipline I wanted, I stood before the boys with a smile on my face. Slowly I turned my face looking into the eyes of each pupil.

At first those in the rear, the "uncles", did not seem to have noticed me. A few others were searching the shelf for something real or imaginary. Some of the remaining were reading the faces of their companions to get their idea about the new figure. Cats mewed and pups yelped. Hummings and chucklings were heard.

As I bore with the ordeal, I finished surveying the whole class. Gradually, to my great surprise, voices went down to whisper and whishpers to silence. A new confidence filled me.

My short but patient survey of the class helped consolidate their heads and limbs before the beginning of each lesson that day.

A look into the eyes

How often, we teachers forget to bring in the heart-to-heart relation by looking into the eyes of every pupil : I knew my own feelings during my boyhood when I felt neglected if the teacher did not look at me. Taking a lesson from this, I made efforts to look around into the eyes of all pupils in the class every now and then, till this became second nature with me. A gentle look plays wonders regarding discipline in classrooms.

Teach well for the whole class

I think preparation for teaching can never be dispensed with. May be preparation becomes easier when experience becomes longer. Pupils, whom the lesson does not interest, envisage their own private engagement and create disorder. A neglected boy found heroism in pelting pebbles at the teacher's back in the class using a stretched rubber band, perhaps to catch the teacher's eye ! Increasing experience supports my faith that the better our preparation, the happier will the teacher and the child feel.

I very eagerly awaited a certain period for which I had a lesson thoroughly prepared. The lesson was a real joy for me and to the pupils too. Profound attention, exemplary obedience, good order and systematic management of the class naturally followed.

But "Order ! Order ! " or "Silence ! Silence ! " I cry sometimes. Does my cry bear any meanig ?

Can you control them?"

It was just before my maiden class and before my training. I sat before the headmaster.

"Well, young man, there are grown-up boys and grown-up girls here. Can you control them ?"

"Yes"

"How ? By beating?"

"I will love them ; discipline follows"

"Suppose they do not love you back ?"

"Love begets love."

After a pause, the headmaster said, "Teach them well; they will follow you. This was the answer I expected from you." He resumed, "Your pupils do not look at your appearance nor at your apparel. They look at what you have for them."

Elimination of thwarting elements

Thwarting circumstances may upset even well-disciplined pupils. A portable film-screen, placed too low for those in the rear at a film show, launched chaos in the hall in spite of repeated advice and warnings. When the screen was placed high enough, perfect order ensued. This induced me to probe into the basic causes of indisciplined deportment among pupils.

Punishment without anger

In my opinion, punishment plays a role in classroom management. It ranges from a mere look of warning to severer measures. On occasions I lost my temper in the class, because pupils neglected home tasks. Often I could trace my anger to the thrust on my greatness and to the thought that the boys insulted me by ignoring the home task ! What punishment I give was, in reality, mere revenge upon the presumed insult. The relief I had after scolding was the relief a snake has after emptying its fangs.

I have to concede that on overcoming the tendency to reprimand or beat a pupil, and instantly looking into myself, I had seen an angry wounded wolf.

My principal told me, "If you can slap a boy without the least anger, that action is purely corrective and has its own value."

Discussed at a Seminar of Teachers, I heard that corporal punishment, if given, must surpass flesh and touch the heart of the child, and if it does surpass the flesh, that punishment is justified.

Discretion is the only judge. Where a casual look of disapproval corrects a sensitive pupil, any bitter remark is murderous. I witnessed one incident. A headmaster in Malabar humiliated a boy of sixteen, his own son, before a mixed class on a very silly matter, and the boy who thought he had lost everything when he lost his prestige, went home and shot himself dead!

Eddy, not the pool

Changing methods hold my interest and theirs. In teaching addition of directed numbers, I staged a new aid, a battle between two rival armies, positive and negative, with soldiers in matchstick drawing.

To add +7 and −10. The children see 7 positive soldiers and 10 negative soldiers. The parties are at strife. Assuming that one soldier shoots down one rival and gets shot down himself by that rival, the battle ends when three negative men remain alive. So the answer is clearly −3. If the soldiers of the same side meet, their rifles are at rest, and they simply join together.

Thus contriving new aids in teaching, I sustain my interest and theirs. I try out new experiments in teaching each topic, and this experimentation gives me new pleasure which is reflected in my children. Where there is sufficient interest in the teacher and the child, class-room management offers no problem at all.

Redress injuries caused to children

However careful I may be in the class, sometimes I lose self-control and go to the extent of reprimanding or even beating a child. As soon as I cool down, I do try to redress the injury I caused to the feelings of the child. "Well, my boy, I know it is painful to you, but understand that it is equally painful to me. You know why I scolded (or beat) you?—Yes, then it is all right." Such words actually redress the injuries, if any, caused to the child's self-assertion by my word or deed.

(C) TACT

The tactful touch

Almost every high school class I engaged had a few pupils too old for the class. Mohan was one. Owing to indolence, he got detained repeatedly. A stigma fell on him and he was called 'Mohan the Muff'. Parents and teachers condemned him.

On the road, one day, his father spoke to me before him, "Sir, I am an unfortunate father. Look at this idiot God has given me! Is he not the worst fool in your school?"

I told the thirsty father how well Mohan, the Basketball Captain, was admired on the playground. Also I revealed that Mohan was intelligent and had stood first in Hindi two years earlier. With a glance at Mohan, who stood with head hung down, I remarked, "Mohan will top the class again." Taking him by the hand I said, "Will you not?"

Mohan could not speak. He was near tears.

I took the opportunity by the forelock. Mohan had a good groundwork in Hindi but he neglected Hindi as a seeming revenge upon the Hindi teacher who used to humiliate him. I managed to get over Mohan's prejudice and had him pay heed to Hindi so that at the next examination Mohan stood first. I congratulated him before the class and out of doors told him to work for the laurels in other subjects too. I said, "Mohan, you are an elephant. He does not know his size". This worked well. The experiment thrilled me. Dear Mohan died of snake-bite and the experiment ended.

That's not the way at sea, my boys

During an educational tour, oranges were being served. Pupils, one and all, competed in choosing the best fruit for me. Without any charitable thought, I refused the offer. In the renowned Captain's words, I said, "That is not the way at school my boys." This event hardly deserved remembering, had not the boys considered it a great sacrifice on my part for their sake. Thereafter, taking the children out, I was the last to eat or go to bed.

It was on such occasions that I slipped into the hearts of my children.

One way to the hearts of children

My headmaster said, "You have to teach mathematics, and the classes sometimes tend to be dry. You tell them a story". I told them one in the very first class. Years have elapsed since then, and I tell stories when occasion arises or even on contrived occasions. Stories vary from little incidents to tales from authors. I have found that at the bait of stories, children willingly offer to do extra work.

"The way to the heart of children is through the mouth", runs the saying, let us add, "and through tales as well." Gratitude to the teacher evolves good discipline in the class and in the wake of my experience, I say gratitude follows story-telling.

Something special with you

My senior teacher's words, told at the Training College, have lived in me. He said, "Besides teaching, I would show them how to somersault on the lawn, or teach how to make flowers out of colour paper." I, in my turn, found educational tours, long and short, as an additional activity which helps me become friend and guide to my children.

Laugh with children

"Laugh with them and you won't be laughed at," goes the maxim in the teaching world. The teacher's stumbling over a leg of the easel or over an error committed unawares, may incite laughter among pupils, but if he laughs with them he never will be laughed at. While observing his class, I heard my senior teacher laugh and say, in reply to a surprise question, "Well, my boy, few in this world know everything and your teacher is not one among them. I will give the answer tomorrow". I admire the big heart behind the words.

Fun helps order

Fun is always at hand in the class. Just the other day, I got the pupils stir up in an English class as we came across the phrase, 'to make signs to others'.

I said, "Imagine you know no language I know. Now, ask me for some food". A boy came forward and did it. It amused the class.

Such amusements relieve the monotony, if any, which is one of the elements creating problems in classroom management.

Freedom for 'short-circuit'

At a mathematics seminar, a veteran teacher poised a scheme, based on his own findings, to remedy backwardness that defied the teacher's aid. When limited freedom was allowed to pupils for casual discussions, the 'backward' gradually came up. Engagement of the backward helps discipline in the class.

Avert revolts

Human nature revolts against imposed deviation, good or bad, from routine. So a reform in class routine had better follow the pupils' knowing about its utility. I find my own principal tactfully allaying the sting of imposition while adding something to the code of conduct.

A remark on remarks

I remember my own experience as a pupil which taught me wariness in making remarks. Meeting my parents on the road, a teacher remarked that I was becoming indifferent in studies. He might have done so merely to show that he was watchful about children. Records showed that I was fast improving. The cruel remarks depressed me for many days and I remember this incident when I have to pass any remarks about children under me.

Teacher, the Gospel of Discipline

In the field, I have noticed that if a teacher is strict in observing rules himself, and prompt and punctual in keeping promises to children, pupils seldom outrage discipline. I can boldly assert that when I refused to listen to scandals or complaints brought up by a pupil about another teacher, that pupil had a new fear of me, a sort of moral fear, which is the biggest of fears and helps classroom management.

16

Planning of the Total School Programme

N. G. Thakker

TO DAY WE ARE facing the problems of achieving world peace, international understanding, human brotherhood, personal happiness, and problems in the political, social and economic fields. All are now agreed that education can lead the way to a better world. The schools are the proper agencies which can solve our problems and translate our hopes into concrete reality. What is necessary now is to give a new orientation to secondary education as a whole. The question before us is: "How can we direct educational change in an orderly manner along lines of desired objectives?" This problem can never be solved once and for all; it must be met again and solved again every day through efficient planning of a comprehensive total school programme and its implementation.

The present position of 'Planning' in secondary schools

Nowadays in schools we generally do not find detailed planning in advance for the total school programme. In most of the schools, courses of study in various subjects as prescribed by the Education Department are divided monthwise according to the chapters in the textbooks and this outline of the subject-matter goes by the name of 'planning'. The teachers carry on their work on old traditional lines from year to year and communicate to the pupils information as given in the textbooks. Sometimes the head according to his whim issues circulars, fixing up some extra-curricular activities, assigning work to various teachers and directing them to make necessary preparations. Periodically, circulars are received from the Education Department, directing schools to celebrate Independence Day, Gandhi Jayanti, Teachers' Day, Social Week, Scout Week, Republic Day, Flag Day, Sports Week, Vana Mahotsava, etc., and the head passes on the circulars to the teachers with necessary instructions for compliance. This is how the schools work. Even today the planning of the total school programme with all necessary details is a new idea in schools in India.

There are many teachers who even today cannot understand the value of planning. They argue that their teachers did not do any planning and with all that they did excellent work. They go to the extent of remarking that it has become a fashion to talk about planning and avoid doing work. It is difficult to convince such teachers who have all their lives worked without any plan.

Need for planning

Planning has definite advantages practically in every field of life. There is no doubt that with proper planning work would be executed effectively and efficiently without any wastage of time and energy. Without planning there may be a congestion of activities during particular periods and no activities during some other periods. If there is planning, the work can be evenly distributed throughout the year and the time available can be utilized for educational purpose to the best advantage of the pupils. Planning provides opportunities for evaluating the past year's work and effecting reforms wherever necessary. If that is not done, the old order would continue without any scope for progress and experimentation. The world is rapidly changing and educational ideas are consequently undergoing a revolution. We cannot afford to be static, and without planning the educational system would fail to achieve the desired goals of our country.

Guiding principles for planning total school programme

(1) Every school has its own individuality. So the school programmes differ from one school to another. In the planning of such programmes, a number of factors contributing to the individuality of the school have got to be taken into consideration. Local conditions have to be paid attention. The aims and objectives of the institution running the school play a vital part in the fixation of the school programme.

(2) The total school prgramme should deal with all the learning experiences which children have under school direction. It should not be restricted solely to formalized classroom instruction. It should include all phases of school-life, out-of-class school activities, such as school clubs, dramatics, athletics, students' self-government, community services and community relationships, human relations such as teacher-pupil, pupil-pupil, etc., counselling, school services—health, library and the like. All these phases should be continuously evaluated in the light of whatever criterion seems most useful and desirable.

(3) Planning of the total school programme should be essentially a co-operative venture of teachers, the head of the institution, management, inspectorate, the State Education Department, Training College Extension Centres as well as the community. Contributions from all involved must be secured. Best action results from the best ideas, and best ideas are secured only when ideas from many sources get an opportunity for expression.

(4) Problems of modern society keep changing continuously. Political, social and economic conditions change and new problems arise. Under these conditions our planning cannot remain static. Our school programme should be a continuously developing process and must be born anew every day.

(5) India has decided to transform itself into a secular democratic republic. This means that planning of the total school programme should contain features of a society-centred democratic movement.

Features of a well planned and balanced school programme

(1) A school which features a good

student-activity programme, a highly developed social life and high-quality classroom instruction, is said to have a balanced school programme.

(2) It provides a richly varied pattern of activities to cater to the development of the children's entire personality.

(3) It will appeal to, and draw out, the powers of children of varying temperaments and aptitudes.

(4) It provides an opportunity for students to develop qualities like patience, good temper, sincerity, clarity of thought and fellow-feeling.

(5) It trains them in the allied qualities of discipline and leadership.

(6) It prepares students to assume full responsibilities of democratic citizenship.

(7) In the planning of a broad and balanced school programme, academic activities like debates, discussions, dramas, school-magazine, social activities like the organizing of different functions for the school community as well as the local community, sports-activities, manual and practical activities, social service projects, are all woven into a rich and unified pattern, within which every child will be able to find something to suit his tastes and interests.

The philosophy and the programme of our schools

We have three high schools that are run by the Saraswati Vidya Mandal, Ahmedabad. All our schools are situated in the labour area of the city. The schools provide educational opportunities to the children of mill-workers with a high proportion of Harijans. Except for a small minority, the parents are all uneducated. The home conditions of the pupils are far from conducive to study as most of them live in slums.

The schools are run by the Mandal to bring new hopes and to guide the pupils of the lower income group to a more enlightened way of life. It is the philosophy of the school to offer pupils, parents and teachers a stimulating environment and programme of work in order to help them in the full development of pupils.

Detailed planning of the total school programme in our schools

In the month of March every year, every teacher (we are about 100 in number) is given an evaluation form. He is supposed to evaluate the school programme for the current year and give suggestions, if any, for modifications in respect of syllabus planning, evaluation tools and techniques, social and cultural activities, functions and festivals, teachers' activities pertaining to teacher-pupil relations, pupil-pupil relations, parent-teacher relations, etc. Subsequently, in the beginning of April we hold the Action Research Workshop. It is only selected teachers who are invited to participate in this workshop. They scrutinize the evaluation forms filled in by the teachers, consolidate various suggestions, consider them from different angles and make recommendations to the general session. In the light of suggestions they define the line of action for the planning workshop. Then the planning workshop is held to plan out the total school programme for the next year.

The total school programme consists of:

(*i*) teaching of various subjects as per syllabus prescribed by the Education Department,

(*ii*) evaluating the achievements of the pupils,

(*iii*) organizing various co-curricular activities,
(*iv*) imparting educational, social and vocational guidance,
(*v*) promoting human relationships, teacher-pupil, pupil-pupil, parent-teacher, etc., which make up the social climate of the school as a community.

How is syllabus planning done ?

The number of actual teaching days during the year is calculated and the total number of periods for every subject is worked out. According to our calculation we get about 180 teaching days (barring the days of examinations, functions, festivals, etc.) during the year. In our schools the year is divided into three semesters A, B, C, each semester having about 60 working days. The courses in all subjects are divided into three parts and each part is divided into smaller units, keeping in view the total number of periods allotted to each subject. For teaching every subject, broad objectives have been defined. The form for the syllabus-planning has the following columns :

(*i*) Unit-sub-unit, important points and salient features of the teaching unit if any.
(*ii*) Objectives to be achieved.
(*iii*) Teachers' activities.
(*iv*) Pupils' activities.
(*v*) Teaching aids.
(*vi*) Reference books, if any.
(*vii*) Evaluation scheme.

The planning aims at emphasizing learning and minimizing teaching.

Planning of examinations

We have been experimenting on examinations, paper-setting and evaluation of the pupils' progress for a few years in our schools and so the planning of our system of examinations has some special features, which for every teacher working in the school has become a subject of careful study and practice.

We set up an Examination Committee which is in charge of all affairs regarding examinations. It has its Chairman, a Secretary and Joint Secretaries. Joint Secretaries have their posts school-wise. They hold the same status as the Secretary. The Examination Committee's work comprises of :

(*i*) meetings and discussions,
(*ii*) paper-setting,
(*iii*) moderating,
(*iv*) printing and press work,
(*v*) seating arrangements,
(*vi*) supervision,
(*vii*) assessment,
(*viii*) collection and distribution of marks-sheets,
(*ix*) maintaining records of deliberations, discussions and decisions at various meetings,
(*x*) declaration of results,
(*xi*) inviting criticism of the question papers set ; assessment and making final decisions.

The Secretary has various duties to perform. His primary duty is to keep every teacher informed of the planning, conducting and other necessary details of the examinations. He issues instructions from time to time in respect of examinations as per decisions taken by the Committee. Circulars are issued when necessary. At the end of every semester there is a written test. There is no annual examination. All the tests of the year are considered for the purpose of evaluating the achievements of the pupils. Such a practice discourages last days' effort and ensures regular day-to-day work. So the annual examination is done away with in our schools and pupils are promoted to higher standards or detained on the basis of the average results of all the tests.

If teaching is made objective-centred, it goes without saying that testing also should be made objective-centred. At the initial stage during planning workshop, the question papers that were administered in various subjects in the past are scrutinized by the teachers, and model test items keeping in view the objectives to be achieved are drawn for future guidance and reference.

Planning of internal marking scheme

The scheme spreads over the whole year up to the middle of February. Every year we have been modifying the scheme in the light of our experience and removing flaws that are detected. For every subject five marks are reserved for regularity in written work, five marks for social and cultural activities and ten marks for oral performance or practical work or attitude tests depending upon the nature of the subject.

A planning calendar of our schools

There are various social and cultural activities that have a direct bearing on the prescribed courses in various subjects. It is necessary that the organizational pattern of every activity should be defined and planned in advance. The summary of the total school programme is published in the form of a planning calendar known as "SMARANIKA." Every teacher and pupil is given that calendar in the beginning of the new year and every one knows in advance when a particular activity is scheduled, when preparation is to be made for that activity, when there would be examination, when our schools are to be closed for holidays, etc. It is not necessary to issue circulars every day or put up notices for many items of the programme. All the pupils can refer to the planning calendar and get ready for the items concerning them.

Pupils' activities in our schools

(*i*) Literary activities—Manuscript magazines, Debating and Elocution competitions, Literary Clubs.

(*ii*) Students' Union, Social Work, A.C.C. and Scouting.

(*iii*) Dramatics, exhibitions, class reports, organization of class-wise annual functions.

(*iv*) Various clubs—Science Club, Mathematics Club, Civics Club, Art Club, Music Club, etc.

(*v*) Educational Visits, Tours, Picnics.

(*vi*) Celebrations of Health Week, Time-saving Campaign, National Festivals, Self-teaching Day, etc.

(*vii*) Guidance class for weak pupils.

(*viii*) Night study home.

How are various activities organized and planned in our schools ?

For example :

Dramatics

All schools generally have entertainment programmes once a year. They stage one or two plays in which a few selected pupils take part. The entertainment programme of our schools differ from that of the other schools. We aim at providing maximum number of opportunities for the maximum number of pupils of each class to show their talents. We have class-wise entertainment programmes which include items like short plays, songs, dances, *garbas* and *ras*. An exhibition of collections and creative work of eash class is arranged at that time. The whole programme is known as 'Rang-madhukari.'

Objectives

(1) To develop among pupils interest for this form of literature.
(2) To encourage them to read this form of literature.
(3) To encourage them to write plays.
(4) To improve the speech of pupils.
(5) To develop healthy group spirit among the pupils.
(6) To provide opportunities to pupils for the expression of their dramatic talents.
(7) To develop in them the art of directing and staging a play.

How the programme is organized

There is provision for a home-room period in our time-table. A number of activities are to be carried on during this period. This period gives an opportunity to the class to meet and think of all the problems and programmes of the class. The class committees, in the beginning of the academic year of the school, plan this programme for their classes, keeping in view the items in the Planning Calendar. They select the palys for their classes in the beginning of July. The heads and the teachers incharge are informed. The work, then, is distributed and within a week the selection of the characters is made. The actors start preparing their parts and the practice is done in the home-room period. The preparation goes on for about two months and we have not to give any special time for it.

The programme of each class is to be staged in the month of October, as fixed in the Planning Calendar. Two classes stage their programmes on the same day. Generally, we invite the guardians of the pupils to preside over the programme. The class-teachers give reports on the various activities and progress shown therein by the pupils.

It is our experience that the programme becomes a cooperative effort of all pupils, teachers, parents and the institution concerned. Some pupils have developed an art of writing plays suited for the school stage.

Evaluation

A committee of teachers has been appointed to evaluate the work of the pupils on the stage and the marks so assigned are added to the achievements of the pupils in languages for the purpose of internal evaluation, provided the pupils have offered dramatic as a literary activity for internal evaluation.

Thus all the activities are organized and planned systematicaly and are being implemented successfully as the total school programme is planned in advance.

Parent teacher activities

Parents are helped to take an interest in the work of the school so as to enable children to benefit from the school programme. The P.T.A. is organized in an effective away. Parents' monthly bulletin carries the school news to the homes of the pupils. Parents' Day is organized class-wise twice in a year so as to enable parents to take special interest in the achievements of pupils in the school and discuss with the class teachers the various problems of their children. Periodic lectures are also arranged for parents. In addition, the teachers visit individual families whenever needed.

Planning of a re-orientation workshop

Our schools do not work on the old traditional lines. It was noticed that new teachers got confused and found it difficult to execute our school programme successfully. So we started a practice of holding a Re-orientation Workshop to get together the old and new teachers. The main objective of the workshop is to make new teachers conversant with our ways of working before they go to their classrooms. This workshop is held every year for three days during the summer vacation, just before the school reopens. The older teachers explain to the newcomers the various details of the programme—curricular as well as co-curricular. The teachers go through the school manual that describes all the aspects of the programme. There are also the files of the syllabus planning and the reports of the workshops held in the school. They go through all the papers and then discuss with the old teachers the items that may need any clarification. If the teachers themselves are not clear about the various details, how can they guide their pupils ? It will be the blind leading the blind.

The impact of planning on the total school programme

(*i*) Our schools are situated in the labour areas of the city. Most of the children come from the families of workers in the mills. The home conditions of the pupils are far from conducive to study. In spite of all these inadequate facilities for studies, the results of the S.S.C. Examinations have been consistently good. Some of the pupils have come out with flying colours in the competitive examinations. This is in one way the result of our planning that makes due provision for individual attention.

(*ii*) Though the students come mostly from the poor families of uneducated parents, they develop the behaviour, poise and dignity which the members of a free nation should have and that is the result of our systematically organized all-school programme.

(*iii*) Our planning provides the maximum number of opportunities for the maximum number of pupils. Hence the pupils develop an impressive personality and can discharge their responsibilities with confidence.

(*iv*) Our plans train the pupils in various qualities of citizenship and they possess a unique sense of discipline and responsibility.

(*v*) Our pupils seem to have a high level of general knowledge and understanding.

(*vi*) Every pupil leaving any of our schools goes forth with a Saraswati spark which continues to light his or her future life.

17 A Comparative Study of Different Systems of Assessment

D. C. Jain

THE WAY STUDENTS get promotion from one class to another can greatly influence their method of study and their real achievements. Till very recently, schools promoted students entirely on the basis of their marks in the annual examination. This enabled many students to avoid regular work during the year; for if they crammed important parts of the text towards the end, they usually could manage to score high enough in the annual examination to get promoted to the next class. To curb this tendency, the State Department of Education, U.P., asked schools to hold at least two terminal examinations during an academic year and to consider them both in the promotion of students to a higher class. The first of these two examinations is held in the middle of the year and the second towards the end. They are called the half-yearly and annual examination respectively.

Genesis of the project

In our institution we had a third examination in addition to the required half-yearly and final examinations. We thus held three terminal examinations at equal intervals during the year. Some teachers, however, thought that even this three-terminal system gave students two to three months time in which, because their work was not being assessed, they could be irregular in their studies. During these intervals they advised the holding of monthly tests so that students would be encouraged to put in their best throughout the year.[1]

The investigator, in addition to this, wanted to try out what would be described in this experiment as a system of monthly assessment. He was aware that a large number of students in this school were coming from the houses of working class people. Due to lack of encouragement at home, the achievement of these students was rather low and they were very irregular in their work. He thought, therefore, that if these students were given credit for the assignments which they did in their daily work in the school, they might be encouraged to be more regular in their work. This system would also give the teacher an opportunity to review their class-work and adjust his teaching accordingly. It was, therefore, decided that rather than taking monthly tests, some students might, instead, be given credit for all the assignments done by them during the month.

The investigator was also aware that the idea of internal assessment of work was finding increasing support from eminent educationists and had been introduced in some states in their public examinations. He thought it, therefore, all the more worthwhile to test its validity by conducting an experiment in the school and see how it affects the achievement of students both as estimated by the teachers and as measured through examination marks.

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[1] Though some schools adopt the monthly test system, seldom is an effort made to find out its effectiveness through an experiment.

Objectives of the project

The investigator, then, conducted an experiment to test the effectiveness of these three systems of assessment. These systems are: (1) the three-terminal system (2) the monthly assessment system and (3) the monthly test system. Since the schools tend to measure scholastic achievement through the marks obtained by the students at the annual examination, the same criterion was accepted in this project as the principal objective. A few other criteria were also kept in view to judge the effectiveness of these systems of assessment. They formed the secondary objectives of the project. The first of these criteria was that it should encourage good meaningful learning, and secondly that it should keep the students regular throughout the year. Another important criterion was that it did not much increase the work-load of the teachers. The fourth and the last criterion was that it was administratively convenient to practise in the institutions. These comparisons were made on the basis of the experience of the teachers who taught the students and their opinion was obtained through the use of rating scales and interviews.[1]

These creteria, however, need some description. Regularity of the students was determined by whether or not the students did their assignments in the time specified by the teachers. Good meaningful learning is an inclusive term, but in discussions with the teachers it was found that the size of the class being very large, it would be possible for them to rate the students only for their understanding of subject-matter and not for copying and cramming. They would know whether students had understood the subject-matter or not by questioning him in the classroom and would base their impressions thereon. Teacher's work-load was estimated on the basis of the time spent by the teacher in correcting the written-work and in marking the test and examination notebooks. By administrative convenience it was meant that the teachers were to indicate their preference for adopting these three systems of assessment in the light of the facts that there are thirty to forty students in each class, that the seating arrangement is not crowded, and that adequate printing facilities are available in the school to print test-papers and assignments frequently.

Plan of action

Two experimental and a control group were formed by comparing the results of the students in the annual examination of Class VII, and by equalizing them on the basis of Mean and S.D. of their aggregate marks in all the subjects. All the newly admitted students and those who did not fit in with the above arrangement, were put in a fourth section. This experiment was, accordingly, conducted with three comparable sections of the students of Class VIII, each having a strength of 50 students.

In Section A only three terminal examinations were held. The marks allotted to each of these three examinations were forty, sixty and hundred respectively. In section B, assessment of the day-to-day work of the students was done periodically and it was converted into marks at the end of each month. Six such monthly assessments of work were held during the entire year. They carried an aggregate examination marks for being considered in promoting them. The assessment of work took into account all types of work—oral, written and other—which the students did under assignments from the teacher. The criteria for assessing the day-to-day work, namely, correctness of the response, originality, if any, comprehensiveness, neatness, good hand-writing and review, were discussed with the teachers concerned from time to time. Faculty-wise arrangements were made to ensure that too high or too low marks are not given. In section C, students took six monthly tests during the year in place of these assessments. These monthly tests took place under the supervision of the subject teachers and were conducted in the classroom usually on the last two days of the month. They covered important aspects of the material taught to the students during the month and contained both objective and essay-type questions. Students reading in these three sections have subsequently been referred to in this article as the Three Terminal Group, the Assessment Group and the Monthly Test Group of students.

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[1] This experimental project was approved by the Deptt. of Field Services, National Council of Educational Research and Training, for the year 1964-65 and then extended to March 1966. Earlier they had approved an experiment to improve and standardize test-items.

The courses of the different subjects and their textbooks were the same in all the three sections, and the experiment covered all the compulsory and optional subjects. Either the same or comparable teachers taught individual subjects in all the three sections, employed similar methods of teaching and gave equal time and attention to the students. All relevant records of the experiment were properly maintained.

Evaluation

The principal objective of the experiment was evaluated on the basis of the marks obtained by the students of sections A, B and C in their annual examination. For a periodical check, marks of the half-yearly examinations were also analysed. These examinations were of three hours duration per test paper and covered all the subjects. Both objective and essay-type test-items were used in the examination papers, and steps were taken to ensure that the identity of the students was not revealed.

Marks of all the students in a section were added together, and their Mean and Standard Deviation were calculated. The same procedure was adopted in regard to the marks of the students in all three sections of Class VIII under this experiment. Then the critical ratio between the average scores (Mean Scores) of the students of the three groups was calculated to find out the statistical significance, if any. On this basis, the following conclusions were drawn:

So far as the Mean (Average) scores were concerned, students of the Assessment Group were at the top, and those of the Monthly Test System Group were at the bottom, and those of the Three Terminal Group were in the middle. But statistically considered, the difference in the Mean scores were significant only between the students of the assessment Group and the Monthly Test Group.*

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* The exact scores were as under :

Section	*Mean*	*Standard Deviation*
A	316.00	79.50
B	330.15	86.00
C	291.00	90.00

Critical ratio between section 'B' and 'C' was 2.05 significant at .05 level.

Hence on this basis, only this could be said that students of the Assessment Group were superior to those of the Monthly Test Group. Therefore, it could be said that the assessment of every-day work was more helpful in raising achievement than the monthly test, it being the experimental variable. But no such deduction could be made about the comparative efficacy of the Three Terminal System either with regard to the Assessment System or the Monthly Test System. The investigator then examined the frequency distribution for the scores or the three sections of the students. He found that there were comparatively fewer students towards the lower end in the Assessment Group than in the Monthly Test and the three Terminal Groups. It might, therefore, be also said that weak students benefited through the review of the work in the Assessment Group.

The investigator employed a five-point rating scale to evaluate the project with regard to the secondary objectives. This rating scale was filled in by all those ten teachers who had experience of teaching all the three sections of students under this project. He subsequently interviewed them to check the veracity of the results and to know their opinions more fully. The details of this procedure could be explained to interested readers, but the results could be summed up in this article. The majority of the teachers were of the opinion that students were most regular under the assessment system because they were getting marks for all the work they did during the month. It was also noted by them that this system was a great success in making the students do their home-work regularly and carefully. It was, however, noted by them that the classes being large, adequate individual attention could not be given to students and that weak students sometimes managed to copy assignments from other students. For this reason they thought that this system could give much better results with smaller classes. From the viewpoint of good learning, the first place was given by them to the monthly test system because it required the students to prepare for the examination every month, and thoroughly learn important subject-matter taught to them during the period. The teachers said that their work-load was the highest in the Assessment Group and only slightly less high in the Monthly Test Group. They maintained that from the point of view of the work-load of the teachers, the three Terminal System was the most convenient. As far administrative convenience, they said that the facilities available in the school for seating the students and for printing test-papers were limited and that, therefore, under the existing conditions, the three terminal system was administratively most convenient with large classes.

Conclusion

When the results of the project had been analysed, the investigator, who is the principal of the institution, discussed them in a staff-meeting of all the teachers. They showed great interest in these discussions and the pros and cons of each system were considered. They finally agreed to adopt the monthly assessment system because it was most helpful in keeping the students regular in doing their every day assignments, and because the students of this group had done very well in the annual examination. It was, however, decided that faculty heads should discourage teachers, if necessary, from giving too high marks in assessment of work and that the criteria for it should be frequently reviewed in faculty meetings. Some teachers, however, were strongly in favour of adopting the monthly test system also, because they said, it promoted thorough learning by the students and also kept them regular. The comparatively poor result of the students of this group in the annual examination was explained by them as being due to stiffness of the test-items used by the teachers in the monthly tests which had a discouraging effect on the students. To obtain agreement of all the teachers, the investigator found it necessary to adopt both the monthly assessments and the monthly tests, taking place alternatively in each month, that is, the students were to have assessment of work in one month and then were to appear in a monthly test in the subsequent month. Holding of the half-yearly and the annual examinations was necessary under the rules of the Department of Education, but the holding of the first terminal examination was dropped in view of the increased workload of the teachers. It was also decided that the time which would have, otherwise, been used in the first terminal examination should be employed in monthly assessments and tests. Each of these were to account for ten per cent of the aggregate marks on which the students were to get their promotions.

The investigator could understand that under this system, the work-load of the teachers would increase considerably. It was mainly due to this action research project that the teachers had been able to see clearly the advantages of the system of monthly assessment and had, therefore, given their consent gladly. He has, however initiated some work in the language faculty to devise effective ways of setting and correcting assignments and improving test-items. An experimental project has also been started by him to find out if some extra help in the shape of an additional teacher or an additional period would be helpful to teachers in correcting the written work of the students in specified periods. This project has been approved by the Department of Field Services, National Council of Educational Research and Training for the current year. The management of the institution also appears to have been favourably impressed by the earnestness of the teachers and propose to gradually reduce the size of the classes to facilitate better teaching and assessment. The investigator, therefore, is inclined to think that action research, correctly pursued, could encourage cooperation and productive thinking among teachers on the one hand, and earn them a lot of goodwill and recognition on the other.

18

The Project of Internal Assessment in a Secondary School

S. K. Roy

THE OBJECT of this article is neither an accusation nor a confession but only an attempt to record the result of a few experiments in the project method of teaching which has met with varying degrees of success, and even failure. The source of my inspiration, like that of every trained teacher, was the training college glimpses of the books of Prof. Dewey and his disciple, Dr. Kilpatric, but the actual implementation was due to the provocation of local Extension Services Centre. And the more I have indulged in experimentation, the more I have been involved.

2. For the purpose of this article, I shall attempt to record the experiments in a common area of curricular and co-curricular activities, *viz.*, Internal Assessment. In launching this group project in consultation with senior staff, I have borne in mind that the project should not be a mere programme as a normal feature of the school, there must be a new approach, a new activity in the normal programme. In addition.

(*a*) the aims of the project should be clearly defined,
(*b*) the procedure should be clearly planned,
(*c*) the evaluation should be definite and accurate,
(*d*) the estimates of expenditure must be met from available resources.

3. To take up Internal Assessment, the aim is to gradually reduce the evils of formal essay type examination to their minimum by a rationalized system of continuous assessment of the pupils' all-round progress and attainments at school and home and to achieve the following objectives:

(*i*) to make teaching and learning more effective,
(*ii*) to enable pupils to gain comprehensive knowledge of the subjects of the course,
(*iii*) to enable them to make steady progress throughout the session,
(*iv*) to enable them to increase their power of expression,
(*v*) to enable them to be more attentive and serious in the classrooms,
(*vi*) to enable them to become regular, neat and tidy in their habits,
(*vii*) to enable them to come into closer contact with teachers,
(*viii*) to enable them to be good social workers and worthy citizens.

4. In our internal assessment, every teacher-guide has to remember a few basic points to make the programme a success :

(*a*) That most pupils do not take seriously any part of the school activities if it does not help passing their examinations for promotions.
(*b*) Pupils do take seriously certain

school activities such as dramatic performances, debates, science fairs, games, etc., because they are interested.

(*c*) The inter-relations between objectives (ends), learning experiences (means) and evaluation (evidence) are noted. One has to know where students were at the beginning in order to determine if and what changes are occurring.

5. The following records are maintained.

(a) **Records by pupils**

(*i*) One notebook for each paper,

(*ii*) one record book for practical social work,

(*iii*) one record book for practical craft work,

(*iv*) one exercise book for rough notes of practical work in each science subject, including general science,

(*v*) one exercise book for fair notes of practical work in each science subject including general science.

(b) **Records by subject teachers**

One symbol register for each paper seprately.

6. The method of correction is adopted as under :

(*a*) The subject teachers correct the pupils' work regularly and carefully. Symbolic corrections are made by putting symbols 'S' for spelling mistakes, 'G' for grammatical mistakes, 'F' for factual mistakes, 'O' for omission of facts, 'C' for composition or construction defects, 'P' for defective process and the like.

(*b*) Once in a month, in the normal course of class-work the teacher sets questions which are answered within one period and which cover the preceding month's work. The teacher does not necessarily collect all the answer books but takes, five or ten at a time and returns them in a day. He signs with date the other work-books to prevent any interpolation at home.

(*c*) Teachers also inculcate the habit of self-correction on the students. The practice of correction by exchange of excercise books has been encouraged with good results.

(*d*) At least one monthly test and any one of other works, *viz.*, class-work, assigned work or unassigned work by rotation is very thoroughly corrected, signed and dated by the subject teacher in red.

7. The method of evaluation is as follows :

Symbols for 10 marks are given every month for each subject paper by the subject teachers on the basis of both individul and group activity in and out of the class-room, *viz.*, assignments, monthly test, N.F.C. Programme, and supervised instructions. Symbols A to E are used as : A for 90 per cent and above, B for 70 per cent and above, C for 40 per cent and above, D for 20 per cent and above and E for 15 per cent and below.

8. Credit is given to pupils who do assignments and home work during vacation or holidays while students who are not regular during the term are induced to make it up during vacations and holidays.

9. Only two periodic examinations are held, *viz.*, the half-yearly and the annual. These areas are also treated as monthly tests for the months in which they are held. Promotion is based on the internal assessment throughout the session. At the end of the session, the symbols are converted into numericals. Weightage is given in the order of 10 marks for average of monthly tests, 40 marks for half-yearly and 50 marks, for

annual. For classes IX, X and XI—the maximum marks allotted by the Central Board of Secondary Education for different subjects are adjusted with Internal Assessment.

10. For physical activity and supervised instruction, the P.T.I. and the Librarian maintain separate records. The Physical Training Instructor as the co-ordinater of the House-system and National Fitness Corps programme has access to the medical history sheets of all pupils. The House-masters and the dance and music teachers supply him with information on the individual tastes, aptitude and aesthetic sense of students—as they are revealed from month to month. The language teachers provide the names of pupils who are good in debate and drama. The P.T.I. also bases his remarks on watching the pupils' performance in indoor and outdoor games, cultural programmes, mass P.T. and excursions.

Supervised instruction is held in the Reading Room of the school where the Librarian issues such books to the pupils as are suggested by the subject teachers. The students are to complete a proforma noting the title of the book and the chapter or pages they have read in any month for the information of the subject teachers. The Librarian also encourages the students who form good reading habits and advises the head of the institution on the need for supplementing the books in which the students are genuinely interested.

11. In view of the amalgamation of curricular and co-curricular activities in the Project, the following grade convertion table has lately been included in the final evaluation programme of curricular and co-curricular activities in this school.

12. So far the project of internal assessment is in line with the programme adopted in other good institutions, more or less. The difference may be in degree if not in kind, or less. The success of any project, particularly an educational project depends on whole hearted purposeful activity executed in a social environment. The project of internal assessment has been experimented in this school during the last two years and if the enthusiasm of teachers and students alike is any pointer, there is sufficient justification to incorporate it in the regular school programme after the current session.

13. But the new approach in the project is the spirit of research the search for talent and the ingenuity inherent in such experiments. This is where the head of this insitution has assumed direct responsibility.

Every student maintains a special note-

Word description	Unsatisfactory	Below average	Average	Above average	Outstanding
Point award	0	1	2	3	4
Percentage	0-20	20-40	40-70	70-90	90-100
Letter	F	D	C	B	A

book for Ingenuity Work, divided in so many parts as the number of his subjects—with an index in the beginning, showing the division of subjects—pagewise. Every student is free to write a few lines, draw a few sketches, solve a few problems, paste a picture or a postage stamp, any thing which attracts his attention from books, news papers, films, radio, theatre, picnic and even from imagination. These are to be incorporated on the pages allotted to relevant subjects of his ingenuity notebook.

14. As a guide to the pupils, the Head of the Institution, by his own initiative and in consultation with the subject teachers, had announced the following detailed basis for ingenuity assessment. These are only suggestive and not exhaustive.

English and other language subjects

(*a*) Debate and literary criticism.
(*b*) Articles in magazines including short stories.
(*c*) Poetic tendency.
(*d*) Recitation/drama.
(*e*) Use of library books and keeping notes.
(*f*) Writing mottoes.
(*g*) Critical study of authors.
(*h*) News items.

Science subjects including general science

(*a*) Preparation and collection of charts connected with lessons.
(*b*) Illustrations and sketches of experiments.
(*c*) Self-made apparatus.
(*d*) Notes taken of inventions from newspapers.
(*e*) Acquaintance of good scientists.
(*f*) Notes on observation.
(*g*) Collection of specimen of plant and animal life, etc.

Mathematics

(*a*) Construction and deduction besides home assignments.
(*b*) Planning of play-ground, gardens, science club, craft-room.
(*c*) How to measure the breadth of a river without paper and pencil.
(*d*) How to measure the height from shadow.
(*e*) Quiz.

Social Studies

(*a*) Decoration of the school.
(*b*) Organization of school functions.
(*c*) N.C.C. wing and excursions.
(*d*) Cultural shows/exhibitions.
(*e*) Mass assembly and prayer.
(*f*) Rendering first-aid.
(*g*) Any social work done in an emergency.

History

(*a*) Preparation of charts, time-line.
(*b*) Pictures of places and sites of historical importance.
(*c*) Collection of data of political, cultural and social movements of a period.
(*d*) Date charts of rise and fall of empires.
(*e*) Modern definition of history.
(*f*) Visits to places of historical importance.

Geography

(*a*) Preparation of geographical maps and charts.
(*b*) Maintenance of Museum.
(*c*) Weather recording.
(*d*) Construction of contours, sun-dial and rain gauge.
(*e*) Study of local geography.

Economics

- (*a*) Making chart of the fluctuating prices.
- (*b*) Family budget.
- (*c*) Economic habits of a boy/girl.
- (*d*) Local products.

Home Science

- (*a*) Varities in cooking and household work.
- (*b*) Method of serving prepared dishes of food.
- (*c*) First-aid equipment.
- (*d*) Vitamins.
- (*e*) Preparation of charts and diagrams.

15. The Head of the Institution keeps himself in touch with the pupils to ensure correct assessment of ingenuity. He also sees the descriptive notes or remarks given by the subject teachers at the end of the session in the subject teacher's symbol register. He frequently visits the craft-room, the science club and other practical classes to ensure that the pupil with ingenuity are granted facilities to take initiative for ingenious work. Fortunately for the school, there is no lack of funds to provide materials for practical work. The ingenuity notebook serves as one of the guides for the diversification of courses at the end of Class VIII. It seems to have succeeded in making the students believe that they are learning through doing, through self-activity.

16. There is a Standing Assessment Committee of the school in which the Principal, a member of the Managing Committee, and distinguished local educationists serve as members. Twice during an academic session, the records of internal assessment are produced before the Committee : once after the half-yearly examination andthen before the annual examination. The work books of students, the symbol registers of teachers are produced before the Assessment Committee. Members of the Committee make a sample checking of the records to find out if internal assessment has been done regularly and correctly. The Committee also interviews a number of pupils from each class at random in order to verify whether the knowledge of students corresponds to the evaluation made by the subject teachers. The Committee has recently shown interest in the ingenuity notebooks as a medium of science talents search.

17. The Internal Assessment project has borne one unforeseen result. Apart from its teaching and learning process, it has helped in the maintenance of discipline in the school. As the assessment covers all activities of the pupils both in and out of the classroom, it keeps the pupils, particularly the adolescents, busy.

Besides, the Internal Assessment Project seems to have shifted the emphasis from examination to education. It has opened the gate of what the Mudaliar Commission pleads for the "Freedom of School". There has already been a re-orientation of teachers as well as students who have willingly accepted the motto that "Every thing that is worth doing at all, is worth doing well".

By balancing individual and group work, the project has accelerated our progress from the starting point for curricular reconstruction, with the desire to bridge the gulf between the school subjects and the rich and varied activities that make up the warp and woof of life.

19

A Learning Project in Teaching Business Subjects in Secondary Schools

S. Ramanujam

EVERY ONE IN the field of education agrees that learning takes place effectively if the learner is provided with the opportunity of practising what he is learning. But in most cases the emphasis on practice is lost sight of and only the theoretical knowledge remains bereft of practical experiences. At every stage of education the theoretical knowledge must be integrated with practical experiences to make learning effective, interesting and complete. The practical bias assumes more significance in the secondary level, because the higher training and learning depends much on the firmness of the foundation laid at this stage. The foremost among the several criticisms levelled against the present system of education is that it is bookish. Keeping this in view, I made a humble beginning in my school, to give learning experiences to my students, *i.e.*, the starting of the "Students' Bank Project." Knowledge of general principles and practices of banking is of much use to every one in the present set-up of our society and it is particularly significant to commerce students who need to develop a variety of skills and attitudes required for positions in business and industry. With a view to providing them with opportunities of applying their creative minds and helping them to develop work habits and the quality of decision-making, this project has been organized in the school.

Aims

(*a*) To provide practical experience to students for understanding the principles and practices of banking.

(*b*) To inculcate banking habits among the students.

(*c*) To provide an opportunity to the students to do some creative and constructive work in the area of their discipline.

(*d*) To help them develop good work habits.

Functions

(*a*) To accept deposits from students.

(*b*) To give loans to students for paying fees, purchasing books and other requirements essential for their education.

(*c*) To carry out other transactions which could help the students learn the operation and functions of a bank.

Organization and management

The management of the bank is entrusted to a Board of Directors consisting of 10 elected student Directors, the Head-Master, as the Chairman, commerce teachers, as the *ex-officio* members on the board.

Rules and regulations with regard to the administration, the lending policy and the investment policy are decided by the Board.

Generally, once in a month a meeting of the Directors is held to assess the progress as also to decide about the programme in the succeeding month. A statement showing the income and expenditure, the amount of deposits received, the amount of withdrawals, the new members admitted, the new accounts opened, etc., is presented at the monthly meetings for the approval of the board. At all these meetings the role of the Headmaster as the Chairman is of much significance to us. By virtue of his knowledge, experience and position as the head of the institution, his advice and suggestions are very valuable to us in framing rules and regulations particularly in lending to the students and thereby in giving a proper shape to the project. We record here with much happiness that he has always been sympathetic towards the project.

The day-to-day work is carried on by the students. They have been divided into three groups consisting of 6 students—2 each from IX, X and XI Class. Each group works between 9.00 a.m. to 9.45 a.m., 1.00 p.m. to 1.45 p.m. and 4.45 p.m. to 5.30 p.m. for a period of two weeks by rotation. The two XI Class students in each group are made in charge of the group. They supervise and guide the others in the group and submit the details of transactions at the end of each session to the Secretary (who is a member of the staff).

There is yet another group of six XI Class students (who are not included in the group working in the bank) for the purpose of checking the records. At the end of every week this group checks all the transactions of the week, makes a note of discrepancy, if any, and later in consultation with the Secretary the errors will be rectified.

Capital

The capital is divided into shares of Re. 1/- each which are subscribed by the students. By subscribing to the capital one becomes a member of the bank. The share amount will be returned only when the students leave the school.

The students can also become depositors by opening an account with the bank. The minimum balance to be maintained by a depositor is Re. 1. Any amount not less than 50 paise can be deposited and Re. 1 can be withdrawn any time. Prescribed forms for becoming a member and to open an account are used wherein the consent of the parent is also obtained.

Depositors are supplied with challans, cheque book and pass-book. Now the students are making the payments within the campus through cheques. When they have to pay to the school towards fees, bus charge, etc., they issue cheques in favour of the Headmaster and give them to the office. All such cheques are sent to the Bank duly endorsed by the Headmaster and they are paid after debiting the respective accounts.

In all these 12 months, it has been noted that the difference between the monthly deposits and withdrawls comes to about Rs. 500 on average. This results in the accumulation of money in the bank. Naturally, this has to be invested properly so as to make it earn. An account is opened with the post office in the name of the bank. The excess cash is deposited to this account.

An account is also opened in the name of the bank with the State Bank of Mysore. Several times the bank receives cheques drawn on the State Bank and all such cheques are sent to be credited to this account. The running of this account also helps the bank as an easy method of payment to its creditors. Whenever there is a need for more cash to meet the demand of the depositors it is withdrawn from the post office Savings Bank. The Headmaster has been made the drawing authority in both the cases.

Generally, an imprest cash not exceeding Rs. 100 is kept in the bank and the excess amount will be sent to the Postal Savings Bank. When withdrawal from this account is needed, the Secretary or the Treasurer will submit a demand note to the Headmaster giving the reason for such withdrawal and the Headmaster will make the amount availabe to the bank.

Source of Income

In doing these functions a certain amount of expenditure becomes absolutely necessary. In addition to the items of expenditure like printing charges and stationery the bank has also committed to pay interest on deposits at the rate of 4 per cent. This means, the bank should have some sources of income. At present the bank has the following sources of income :

(*a*) An amount of 15 paise is collected from the members as share application fee at the time of buying shares.
(*b*) An amount of 25 paise is charged to every account as incidental charges.
(*c*) 6 per cent interest is charged on the loans granted to students.
(*d*) 4 per cent interest is received on the amount deposited in the post office Savings Bank and with the State Bank.

In addition to the above sources which will not be sufficient to meet the expenditure the bank has also taken the reponsibility of supplying textbooks and other stationery requirements to the students. Bulk orders are placed with the suppliers and the supplies are received by the bank and are sold to the students. In doing this function the bank is able to earn a considerable income by way of commission allowed by the suppliers. In this regard we are grateful to the Headmaster for extending this facility to the bank. With the above sources of income the bank is in a position to meet all its commitments and also to have some income in excess of expenditure. It is indeed a happy feature to mention here that the bank is, at present, entirely self supporting.

Facilities offered to the students

(*a*) The bank is providing lending facilities to the students in meeting their educational expenditure. Every month applications in the prescribed form are called for and after getting the sanction by the board at its monthly meetings, loans are granted to the students. Even here the parants' declaration to the effect that they hold themselves responsible for the repayment of the loan is obtained. As a general rule the maximum amount of loan that a student can borrow should not exceed one month's fee that he pays to the school and it should be repaid within a month. At the time of receiving loan another form similar to that of a promissory note has to be filled up by the borrower with his signature and also the signature of another student member who has to stand as surety.

At the discretion of the board the maximum amount and the terms of loan can be changed according to the purpose for which the loan is required. For instance, the maximum limit was raised to Rs. 10 when the bank offered its lending facilities to the students to meet the cost of the school excursion and it could be repaid in two monthly instalments.

(*b*) The bank is supplying the textbooks and stationery required by the students.

(*c*) It is providing an easy method of payment through cheques.

(*d*) It is providing learning experience in banking to all the students.

Records maintained

1. *Specimen Signature Register*: Wherein the specimen signatures of the depositors and their addresses are recorded in order of their account number.

2. *Cheque Book Issue Register*: Wherein the details such as the number range of the cheque book, the account number, the name of the depositor are recorded and his signature obtained at the time of issue.

3. *The Share Holders' Ledger :* The details of the names and addresses of the share holders, the number of shares taken, the date of entry, etc., are recorded.

4. *The Deposit and Withdrawal Scroll :* Here the details of the daily withdrawals and deposits are entered.

5. *The Ledger :* All the individual accounts of the depositors are here.

6. *The Cash Book* : Showing the balance of cash in hand and at bank at the end of every day. After varification the Secretary and the Treasurer sign.

7. *The Stock Ledger* : Is also maintained for recording the stock of the books and other stationery received for sale, their disposal and the balance of stock on hand.

8. *The Borrower's Ledger :* Wherein the accounts of the borrowers are maintained.

In all these activities the commerce teachers are rendering assistance to the students in giving proper instructions and guidance. As an extension of this project, this year another wing has been added, *i.e.*, the Students' Book House. Even during its first year, books and other stationery requirements of the students were supplied by the bank. As the bank is fast expanding, it was felt that it would be better to separate this function from the regular banking activities, so that the scope of the project might be expanded. Therefore a separate book house called "Students' Book House" was started. Since most of the textbooks prescribed by the school are not available locally, bulk orders are placed with the publishers and book sellers and they are procured and supplied by the Book House. In addition, other stationery like notebooks, pens, pencils, pins, practical records are also supplied by it. It is hoped that in course of time, the entire stationery requirements of the school will be purchased through the Book House.

The opening of this Book House has provided a very good avenue for the bank to invest its funds profitably. The Book House is financed by the bank. An account of the Book House is maintained by the bank. The daily collection is deposited to this account and payments to the suppliers are made by cheque drawn on the State Bank.

The Book House maintains all the necessary records separately such as Stock Register, Cash Book, Debtors' Ledger, Creditors' Ledger, etc. Whatever profit the Book House makes is transferred to the bank.

The significance of the project in teaching

The foregoing pages mostly describe the organizational aspect of the project. In addition, the project has a great role to play even in teaching learning situation. As I believe that this organizational part should be well understood to realize how this is basically a project designed to help pupils learn effectively and to give them a more meaningful and a real learning experience, I have utilized a greater portion of this in describing the organization and management of the project. I have been using this project as an effective means to make students learn by doing and to integrate theory and practice particularly in the following subjects.

1. *Book-keeping* . In this area, especially this project is a boon to the teacher. The actual accounts in operation are shown to the students and once they see and understand these things they take great interest and pleasure in doing the accounting themselves. They get an opportunity of seeing things clearly and in correct form. They also perceive the relationship and the effects of the various entries in the different records maintained. Valuation of stock, preparation of inventories and calculation of total sales and total purchases are done by the pupils. They are also involved in preparing important financial statements like Profit and Loss, Account and Balance Sheet. They learn with a great understanding the various forms, procedures and methods employed in the preparation of different statements. The experiences they get lead to several lively discussions inside the classroom making teaching and learning pleasant and satisfying.

2. The project has also been very helpful in the teaching of Elements of Commerce including Secretarial Practice and Business Correspondence. No amount of oral description about the method of buying and selling is equal to the actual experience they get in buying and selling. All aspects of retail buying and selling, whole sale buying and selling, cash and credit transactions, credit instruments used are practised by them. They are able to see the entire process of commerce through this project.

As regards business correspondence, students are involved at every stage in drafting enquiries, receiving quotations, placing orders, receiving invoices and bills, complaining about the goods received, making payments and filling documents. They are able to see all these, stage by stage, as they occur. In addition, this project is also serving as a good ground to provide the students real experience in secretarial work like convening meetings, preparing agenda and recording minutes.

This has made them realise the inter-connection of these subjects and understand that the different aspects they study in one subject are closely related to those in others. They also understand the importance of the study of these subjects and their practical utility in life.

Retrospect and prospect

I am overwhelmed by the remarkable progress made by this project during the period of 12 months of its inception.

At present the number of accounts and the number of share holders stand at 220 and 250 respectively. The total deposits exceed Rs. 3,500 and the capital subscription to the tune of over Rs. 600.

The Board of Directors has met so far 10 times and over 40 students have received financial assistance from the bank to meet the cost of school excursion, school fee, bus charge and other expenses essential for their school work.

The second annual general meeting was held in the beginning of this academic year wherein the profit and loss account and the balance sheet for the last year were approved and adopted. Out of the net profit made the board decided to donate Rs. 51 to the School Students' Welfare Fund.

Another encouraging feature is that more and more students from other streams are also coming forward on their own accord with a request to allow them to work in the bank. In all such cases their requests are fulfilled.

With the interest the students are evincing and the progress the bank has made in its very first year, there is every reason for me to hope that the project would be able to extend its activities further and become a permanent feature of the school in the coming years.

20

Indiscipline in Schools—Causes and Remedies

H. N. Sarma

THE SECOND WORLD WAR was much more than a world war. It was not a total war for only the nations that got involved in it, but also a total war for the whole world. It was in fact much more than that. It was a deluge as it were. It affected all aspects of human life in their entirety. Among other things, the tremendous progress of science and technology, the beginning of the liquidation of imperialism, and consequent birth of new nations all over the globe were responsible for all the far-reaching changes that came upon humanity. The impact of the Second World War was very great indeed on India, which was soon being born as a nation again. Old ideas, beliefs, concepts, and even tenets of morality began now to be considered as out-dated and unsuitable. These began to be replaced by new ones rendered suitable for fitting in with the changed conditions of human life. So, the entire humanity was in a sense on the move, and the movement has not ended yet. This unsettled state continuing for long has given rise to a serious confusion and indiscipline all over the world. The whole of humanity has been in a state of indiscipline today. Things never heard of before, like rockets, satellites, sputniks, men journeying to the moon, or enjoying walks in higher regions than what we understand as the sky, nuclear weapons, use of atomic energies for various purposes including destruction of humanity have been agitating the human mind now-a-days. India could not be, and has not been, outside this all-comprehensive effect of this indiscipline raging humanity.

India was reborn as a nation on the 15th August, 1947. This momentous event meant a very great deal to her. She got back her long lost freedom after a protracted and very painful, albeit a peaceful struggle for over sixty years. It was not only a change of masters for her, nor merely a change from foreign to national. The foreign bureaucratic government was gone now : in its place came in the national democratic form of government. The Indian State was now a secular and welfare state, and the form of government accepted by the nation was not only democratic but also of a socialistic pattern. These tremendous changes that took place in India since 1947 overwhelmed and overjoyed the nation in its entirety. The entire fabric of Indian nationhood—culture, morality, philosophy, and even concepts of religion were rudely shaken. The different Five Year Plans coming in its wake added momentum to the forces already working in the Indian mind. The country was now moving fast from agricultural to the industrial way of life. All these changes unleashed tremendous forces in all aspects of life. The whole nation was seized with a kind of frenzy of a lasting effect.

So, over and above the worldwide impact of the effects of the Second World War, India experienced the second impact of events taking place within herself. It was a unique undulation. People at different levels of life, and of the society had different sensations, including those of fear, anger, disappointment, and the like. But the overwhelming sensation was the one of unbound joy, rather wild joy. The over-all effect on the nation was indiscipline above all other effects. The result is that old and established values have been discarded, and new values are gradually appearing, though these are not quite set yet. For want of sobering forces and influences, the nation has been in a state of indiscipline during these long twenty years. The younger generation, which comprises the student community at all stages, being generally of a highly impressionable age, has been the greatest victim to this dire indiscipline.

It is, therefore, cheap criticism for politicians and columnists to blame students and teachers alone for indiscipline among students. I may cite an example in this connection. Let us suppose that a herd of tame elephants, each under a mahut, ripe with experience in dealing with his charge, is being led from an area far from the hub of the industrial cities, and into the heart of a highly developed metropolis full of deafening, tumultous noise of vehicles, whistles, cries, rumblings, and rattlings of engines of different kinds. Let us suppose also that these adult and well-trained elephants are being followed by herd of calves under the charge of some other mahuts. Now, as soon as these adult animals find themselves in the midst of such never-seen queer things moving so terribly and crying so hoarse all in a tumultous confusion, they are sure to run amuck, defying all sobering acts and instructions of their mahuts. When adults run wild, the younger elephants at their heels would naturally follow suit, and the mahuts in charge of them would feel most helpless. Should we, therefore, blame our students and teachers as failing to do their duties ? They are but a part of the Indian nation, now seized with rank indiscipline. When there is a terrible earthquake throwing everything topsy-turvy, how is it possible for a house, or an animal, or even a man, to keep steady without tottering ? Look at our Parliament, State Legislatures, and such other learned gatherings, where elders, grown old with wisdom and experience, behave so very often in a most unparliamentary way. The fact is that the entire fabric of the nation is undergoing severe disruption. We are in the midst of a revolution of a very far-reaching effect. Life in India at all levels is chaotic. How things will settle at the end of this revolution is probably a theme of guess even for philosophers. No one can therefore say the last word on the subject.

While the above is the most sutpendous cause of student indiscipline, *viz.*, the unprecedented nationwide unrest and indiscipline, there are many other causes of this malady. Considered serially, the second is the ever-widening gap between the older and the younger generations, created by the rapid pace of scientific and technical progress in the world, and in India, and further accentuated by her switch on to industrialization. Though all Indians are on the run, trying to keep pace with the progress of civilization, the older generation is far behind the younger generation, who have seen a more realistic picture of atomic war impending before them. Why their elders have not exerted honestly to save the world from the otherwise sure annihilation of mankind, the younger generation fails to understand. In India, our youths do not understand why all the elderly people have so long failed to rise above petty and party considerations, to eradicate corruption at all levels, to behave in a perfectly disciplined manner, to tighten up administration at all points, to give the correct lead to the youths, to organize the nation in a surer way, to enable it to face the menaces both internal and external, and above all to act unitedly as a sobering and steadying force. They are disgusted to find that for failure of our leaders to hold up before the nation a very lofty moral standard individuals have placed selves before the society, and political parties have placed party interest before that of the nation as a whole. They are alarmed to find that the elders are divided into groups much smaller even than their parties in order to safeguard and promote their own selfish interests. So, they have lost all faith in their leaders, though they have great confidence in personages like Dr. Radhakrishnan and a few others, whom they regard with unbounded veneration, and whose words spoken or written they understand, and try to act up to every syllable. But so far as other elderly persons are concerned, the youths are having lesser and much lesser respect for them, irrespective of whether they are their parents or others. These elderly people have not listened to their discontented whispers so far. So, the youths have ceased to have any faith in them. The student community is always now spoiling for a fight in whatever form. Fortunately for the blessings of old Indian philosophy, on which Indian civilization and culture have so long stood, they have not burst out into a revolution as in Indonesia or elsewhere.

Thirdly, as education has been democratized, numbers of educational institutions of all types have been rapidly increasing all over the country, and numbers of students down from the primary up to the university stage have been swelling. Whereas formerly only the more fortunate few, also the more intelligent ones of the lot joined educational institutions, and as they came up, they were carefully screened at all stages, now-a-days all types of students, irrespective of whether they are of the right calibre are not only coming in but also getting on. Talent is rarely searched for, except probably at the university stage in some places. The results have been manifold. Firstly, the number of students without the proper calibre has far exceeded the number of those with a real calibre. The standard of attainment has greatly deteriorated, though for this deterioration there are other causes too. Inattention resulting in indiscipline has been the ultimate effect, although the presence of other causes for this inattention and consequent indiscipline is not ruled out. Secondly, democratization in education has resulted in a large influx of students from the rural areas into towns and cities. These incoming students have discovered a great difference between themselves and those of the towns, a disparity in their very ways of life. They have discovered that while the world is of one kind to them while at home, it is quite of another kind while in the town, and that the difference between the rural life in general and the town life is almost as great superficially as the difference between hell and heaven. This inequality has sown a seed of discontent in their minds, and their daily frustrations have coutributed to proper nourishment of this pernicious seedling. Secondly, democratization in education has resulted in increasing the number of unsuccessful students at all levels. These unfortunates, unable and unwilling to go back to their parental ways of life, have crowded into towns, smaller and bigger, teeming with different kinds of educational institutions, and have willingly or unwillingly helped to fan up the discontent already in the minds of students in schools, colleges and universities. The result has been occasional outbursts of distemper, and indiscipline in all forms and intensity. Thirdly, democratization in education has made personal contact between teachers and students, also between teachers and parents or guardians of students more difficult. This has made a proper understanding of the student mind and a close supervision of the students' behaviour outside working hours impossible, particularly because most of our educational institutions are, except in a few cases, non-residential. A correct reading of the student's mind by a close study of the daily behaviour of the latter alone may guide the elders to prescribe an efficacious remedy. Without a proper diagnosis, no sure remedy can generally be selected. Guess remedies prescribed by political pundits prove very often to be rather harmful.

Fourthly, side by side, with increase in enrolment and educational institutions, there has not been generally a proportionate increase and improvement in educational facilities, including housing, both tuitional and residential, improvement or rather check in deterioration in qualities of teachers, educational amenities of all categories and the like. Naturally therefore, the students have been deprived of the right type of education, encouragement and inspiration in the desired direction. Instruction imparted generally has been of an indifferent type, and students are full of frustration and disillusionment. They come to realize by and by that by undergoing all the educational processes as arranged by the authorities, they gain nothing, but waste many things including time, money and energy. They erupt in course of time. The result is indiscipline.

Fifthly, the type of education imparted is far from being of the right type that the country needs, in order to make them good citizens in all respects. The first aim of education in a democratic country is to make the learners good citizens. But the type prevalent now makes the learners some strangers to their hearth and home. They are alienated from their kith and kin, a process of disintegration sets in at home, the young learners begin to keep attached to their families only for food and clothing including some money to go by, and have to seek for new centres of attraction. They develop a new loyalty, not generally of a beneficial nature and character. As this purposeless education turns out annually a bigger and still bigger number of unemployed youngsters most young learners transfer their loyalties to these bureaus of unemployed youths, and thus help to swell their ranks. The number of unemployed youths in the country has already assumed a terrifying dimension, and this bulk in all parts of the country has generally been the source of inspiration for the bulk of students in secondary schools and colleges. The fear of unemployment facing them as soon as they are out, inspires them to join these unemployed centres and groups. These groups of unemployed educated youths are also swelled very often by the non-student elements of the same age-groups, who, though uneducated, have imbibed a habit of the educated youths, and a consequent dislike of their paternal trades and occupations.

As in the story of Dr. Jekyll and Mr. Hyde by R.L. Stevenson, man has perpetually been a victim of a tug of war between two contradictory forces, one beneficial and the other baneful. While conscience and power of reason pulls man upward, the mind under the urge of harmful propensities drags him ever downward ; and the upward pull is far weaker than the other. So, it is necessary to strengthen by all possible means his reasoning power and conscience in such a manner that his character is uplifted and ennobled, and never downgraded. For this purpose it is necessary from his infancy to inculcate in him the enduring tenets of morality and religion. It was in fact on such sure foundations of morality that an Indian life used to stand in the past. An Indian was generally God-fearing ; he was more or less philosophical in character as westerners used to say. Now India has been a secular state. This secularism does not preclude any one from teaching the children the fundamental canons of morality and the universal aspect of religion. But it is very unfortunate that since we achieved Independence, this important aspect of education has altogether been neglected. It seems as if reason and conscience have totally been banished, and that the mind is having its full sway ; and in the absence of any opposition from the conscience, the mind is dragging the youths ever downward ; and the scope has been ample for this sinister urge : the diversions are many now-a-days, and these are very often more harmful than not. Present-day students have great opportunities to indulge in these diversions, firstly because their youthful energy, always in search of something new to do, does not find very much to busy itself with for the purpose of upliftment, and secondly because the baneful diversions are far more attractive and alluring than their immediate duties that students have to do. The general run of students consider their legitimate duties as some drudgeries, and would ever shirk to do them unless compelled by some exigencies.

It is not always true that political leaders incite students to acts of mass indiscipline. It cannot however be gainsaid that sometimes they act in that direction, and with political motives. But even when they intervene honestly, and try to restore 'normalcy' in some student agitation, their intention misfires very often, and student unrest is generally aggravated.

Over and above the interference abovementioned, we have to say without any reservation that the cause of education has suffered a set-back at the hands of some of our political leaders. Educational institutions are created for political reasons, and to serve political interests, though from an educational point of view, such institutions are not necessary. Such creations do not serve the cause of education : rather these do a great disservice to it. Often local factions and petty rivalry and jealousy are responsible for some new educational institutions. These are as harmful as those founded for serving political or communal purposes. Such institutions tend generally to promote indiscipline, often of a massive character.

In secondary schools, an additional cause of indiscipline is the influence of the age-group to which students of the upper secondary stage belong. Adolescence is a very dangerous period of life. Proper guidance and careful attention from persons, whether they are parents, teachers, or some other influential leaders of the society, must be supplied to them in proper time. Delay is dangerous. Indifference to their grievances and other causes of excitement may cause a conflagration in a trice. While some acts of collective indiscipline have their roots somewhere in their own institutions, they often get the initiative from external sources, and very easily they catch the contagion ; for indiscipline among students, as also among the mass people, is extremely contagious. Unfortunately, there is hardly any useful agency, internal or external, to handle such cases of indiscipline among adolescents. It is during adolescence that students transfer their loyalty from home, also sometimes from their teachers to some external agencies or persons. Sufficient care is not taken at this stage to supply them the leadership that they seek for. This leads to acts of indiscipline at a later stage sooner or later.

Yet another cause of indiscipline in secondary schools is the lack of firmness accompanied with sympathy and kindness in educational administration. Students in their adolescence are highly sensitive. Teachers enjoy the full confidence of their pupils till the beginning of their adolescence. Whatever they say, they take as gospel-truth. But adolescence makes them a bit critical.

If at this stage they find some weakness in their teachers, or want of sympathy and kindness for them, or even some acts of injustice according to their standard of judgment, they lose confidence in them. Then they begin to look for inspiration elsewhere, and such inspiration is supplied easily. It is then that they begin to go astray, and behave in a wayward manner. This signal of the coming danger is not properly heeded by many educational administrators. The result is rank indiscipline, which spreads like wild fire.

Let us now try to discuss the possible remedies for these and such other ills in our students. The first and foremost remedy should be steadying forces exerted with firmness by our top leaders over the whole nation. They should organize themselves to free themselves from corruption, weakness, party or factional or self-interests, put the entire administration on a very firm footing, and thus cry halt to the nation, to give up their unrest, and settle down to their legitimate work under whatever conditions. Government must be fully geared to meet all the exigencies. Social education should be pin-pointed to achieve a state of perfect discipline. Without discipline among adults, discipline should never be sought for from the students. Any other interest, whether of the self, or of a group or faction or of a party, must always be subservient to the national interest, and if there is an occasion to sacrifice one, the former should be sacrificed in preference to the latter. This may be considered as the panacea for the national ills.

Secondly, the older generation, *viz.*, the adults should be less rigid and less conservative and more imaginative in their attitude so that they may meet the younger generation half way. They should try to understand the viewpoints of the youths, and give up the attitude of misunderstanding them. Thus they should always seek for compromising their bent of mind with that of the students. This does not of course mean that they should be weak and yielding in all cases. Firmness accompanied with an attitude of understanding the opposite viewpoints will yield a desirable result. They should tell the students firmly what is expected of them by the nation, and what they should do to safeguard and promote the national interests. They should assure them that so long as they do their legitimate duties, the elderly people will always listen to their grievances, will redress them so far as possible, and lend them help and support whenever needed. They should appreciate their more liberal outlook of life, and not condemn it. Thus alone will it be possible for our leaders, educational administrators, and parents to restore confidence in and loyalty to themselves.

To check deterioration in the standard of education in all types of educational institutions, and to minimize wastage, detailed and elaborate programme should be chalked out for all-round improvement in educational facilities, including housing and teaching personnel; there should be effective screening at different stages in order to bring about uniformity of the calibre of scholars, thus to make them homogenous as far as possible in a particular standard, and to make teachers' work easier thereby. In order to prevent the resultant wastage, different types of vocational and technical education of a more purposeful character should be made readily available, and at attractive terms. Career guidance measures should be very effectively organized right from the secondary stage, and every student should be properly guided according to his calibre. For this purpose, all students should be taught to have a clear vision as to their aim in life. Education directed to that aim, and guidance and help given to him to fulfil his aim will alone be purposeful and effective. At present our students even at the university level have generally no aim in life. They do not know what they are going to do after they come out into the world. Career guidance should be made a regular feature for students to join at the secondary stage.

Removal and reduction of disparities and differences in the ways of life and amount of opportunities available to students of rural and urban areas is a stupendous problem to be tackled at the national level. It is recognized that it will take a long time to achieve a tangible result in this direction. It is to be appreciated that some big and bold steps have already been taken, though much more remains to be done yet. From the viewpoint of educational institutions, all existing disparities between such institutions of the same standard, whether situated in rural areas or in urban areas should be removed. Unfortunately, aided secondary schools and colleges, which are in rural areas in the main, seem to belong to none, and government does not pay them the attention they need for their appreciable improvement, though they have to educate the bulk of students of the country. Students in these aided institutions enjoy much lesser facilities than students in government institutions, which are all in the towns. All such inequalities should be removed.

Effective measures should be taken to establish liaison between students, teachers and educational administrators on the one hand, and between teachers and students' parents or guardians on the other. The psychological distance between teachers and students should be narrowed down by all possible means. Heads of educational institutions should appoint teachers under them to observe students very closely, to know their difficulties and grievances, and to report their findings to their staff meetings for taking proper action. Grievances of students put forward either through students' organizations or through any other collective effort should be patiently listened to, and quickly redressed as far as possible. If the grievances are more fictitious than real, this should be clearly explained to them with sympathy and kindness. Heads of institutions should make it a regular feature to listen to students' representatives, and to invite them to take a share in administration work. Students' Panchayats, both zonal and central, have been tried, and it has proved very effective in upgrading discipline, improving attendance, minimizing offences, and in toning up the character of the whole institution. The sense of discipline, and response to it must be spontaneous. Discipline enforced from outside is less effective than discipline coming from within. So, measures should be taken to entrust the responsibility of maintaining discipline in the main to the students themselves with experienced teachers as their guides. Measures recommended by these agencies should be accepted as far as possible, and if necessary, in a modified form, by the heads of institutions. This device has been found very effective at the school level. I have no doubt that it will be equally effective higher up also.

In India, most of our educational institutions are of a non-residential type. That being so, students spend a bigger part of their time with their parents or guardians. In order to know about that part of their daily life, and to let parents know of the part of the day students spend under teachers, teachers and parents should meet very frequently, mutually complete the study of each student and his difficulties, his diversions, etc., and devise solutions, and then watch results. Adolescent students at the secondary school level need such study very much. If these students are kept under proper discipline, and are given practical guidance at this stage, they will generally create no problem regarding discipline at any later stage.

Our educational institutions are not attractive enough, either physically, emotionally, or from any other point of view. They repel students more than they attract them. They are generally very wretched and shabby, at least the bulk of them, both within and without. The missionary institutions are in a far better condition. Educational facilities that these institutions provide and the amenities that they offer are of a much higher standard than those that other institutions can afford to give. India is a very poor country. Expansion of education is very important no doubt; but it is much more important to improve the conditions of the existing institutions. Much more has to be spent [for all-round betterment of them, in order to make them attractive enough for adolescent students, particularly at the secondary stage. Attractions, both curricular, intra-curricular and extra-curricular, should be so ample and diversified that these adolescents may not have to look for other attractions elsewhere. If they are kept engaged in such a way, they will have neither the time, nor the tendency to join rendezvous, to idle away their time, and to relapse into indiscipline. They must be made to feel convinced that their time, money and energy are being spent in a useful way, and that they have learned something good, both physically and mentally. There must not be any sense of frustration in them. But in many of our secondary schools, there is not even sufficient classroom accommodation, not to speak of anything else. How can we blame our students, if they feel discontented? The average aided school is a fit breeding ground for indiscipline. Students get imbued with it in course of time, and burst into fits of indiscipline on occasions.

Democracy has made all people including students conscious of their rights. It is this consciousness of their rights that makes all very angry and exited so frequently, and they throw all sense of discipline into the four winds at the slightest cause for provocation. Students, mass people, workers in factories, and in fact all forget that rights are always accompanied with certain duties and obligations, that freedom has no meaning unless there are certain restrictions. It is a basic duty of all in a democracy to do their duties and discharge their obligations to the state, if they want to enjoy their rights fully. This fundamental truth we have not learned during these twenty years. This should be made the foremost item in the programme of our social education. Political workers, students at all stages, workers in different industrial undertakings, members of the trade unions, etc., should be taught this truth in all possible ways. It is this sense of duties that will weigh their minds down, when they want to indulge in a fit of indiscipline.

Types of education that our youths are being given are not of the right kind. Education must be purposeful, and must prepare the learners to be good citizens, above all other things. It must therefore inculcate in them a sense of duty to their mother land, to their hearth and home. Necessarily then it will teach them to love their paternal and ancestral trades, and to improve them withal. However much they rise in life on the spiral of ambition and prosperity they should learn simultaneously to fix their attention to the foot of the ladder on the ground beneath. With all our bias for basic education, this basic truth has been lost sight of. Our youths are forgetting the very basis of our culture and civilization. They are learning something strange and new, which runs counter to things and ideas, that supply the life blood to the Indian nation. This meaning of basic education our youths are not being taught. Once educational curriculum is so framed, and our youths are so taught, our education will be more purposeful, and it will turn out men and women, who will engage themselves in different avocations of life according to their fitness. There will be some easing up of the unemployment situation also.

While there should not be any external intervention in acts of indiscipline in educational institutions, at least so long as it is not called for, educational administrators should meet from time to time, and devise ways and means to deal with any eventuality in a uniformly firm manner. This firmness should always be accompanied with kindness and sympathy for the students, and along with it, there must be suitable steps taken to explain the necessity of such firmness shown in the larger interest of students themselves. Students should be told that different student organizations are not the same with trade unions, and that these organizations should not therefore be misused in that way. Any weakness in educational administration is bound to supply a loop-hole for a flare-up among students, whenever there is an occasion. An example of like weakness is supplied occasionally from a neighbouring institution. Hence, there should be combined and united efforts taken together by all educational administrators of an area, whereever and whenever there is a flare-up.

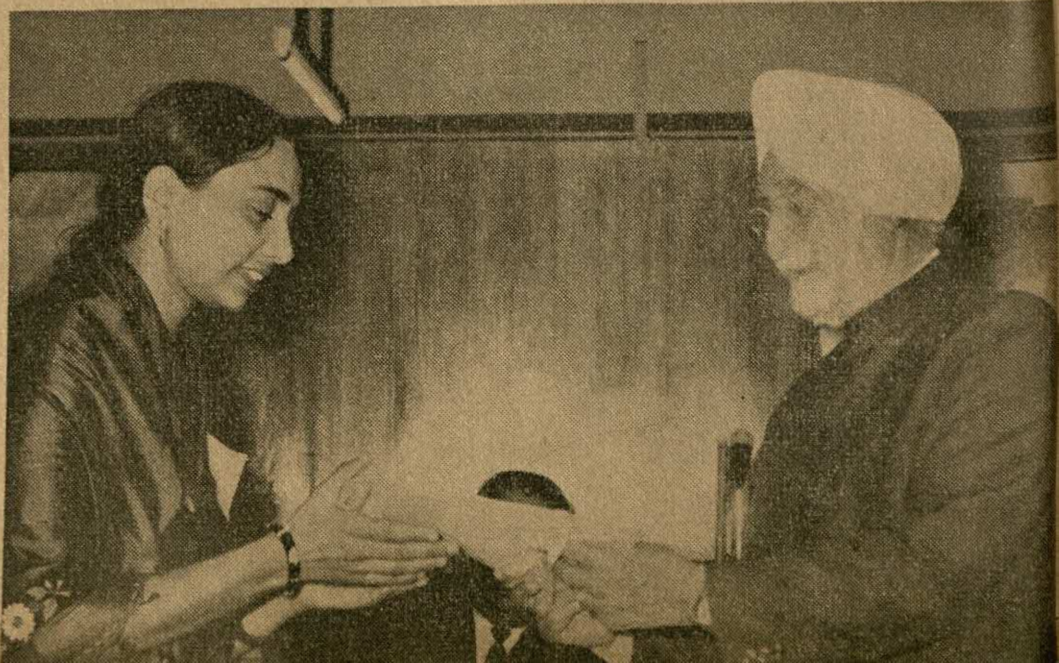
Non-student youths, also students, who belong to other institutions, may very often supply some incitement to indiscipline in another institution. United efforts by all educational administrators will relieve the tension created by students of other institutions. So far as the non-student and unemployed youths are concerned, government may, in collaboration with voluntary organizations, look into their needs, and try to find out for them some constructive channels, so that their energies may be usefully diverted instead of being so wasted away.

Lastly, it must always be brought home to the students that tomorrow they will be full-fledged citizens, and posted at the helms of affairs of the ship of state ; thus they will also be called upon to discharge their duties manfully, and in all possible ways in a benefitting manner. The student life is but a field for preparing themselves for their future onerous roles. Through debates and discussions in student organizations and through even their hidebound class work routine, a constant effort should be made by teachers and educational administrators to inculcate this invaluable lesson. Through moral teachings, a code of conduct should be gradually evolved for students, much like the code of conduct for employees, for cadets and scouts and the like. Scouts, guides and N.C.C. organizations can play a very important role in teaching discipline to students. But it must not be forgotten that discipline imposed from outside is more or less formal and less strong than the sense of discipline evoked from the heart through the exercise of conscience and reasoning power. Discipline coming from outside is always accompanied with fear, whereas that coming from within is accompanied with or is born of a sense of love of duty, and reverence for one's ownself and for God. Our students have come to believe that they can very well dispense with God. This is a very dangerous attitude of the mind. Secularism does not mean dispensing with religion or God. It simply gives everyone the freedom to pay obeisance to any religious doctrine that he chooses, and to pray to God in his own chosen way. Our youths need to be taught this. Godliness is a virtue that probably comprises all the noble qualities of the head and heart, and none can dispense with godliness.

APPENDICES

Welcome to National Awardees and guests by Dr. M. D. Paul

His Excellency, the Governor of Madras is presenting award to one of the National Awardees



APPENDIX I

WELCOME ADDRESS

Dr. M.D. Paul, Director of School Education, Madras

I HAVE GREAT pleasure in extending a hearty welcome to his Excellency Sardar Ujjal Singh, Governor of Madras, a distinguished son of India, an outstanding citizen of eminent fame and an able statesman, to the Fifth National Meet of the Winners of Awards of Seminar Readings for the year 1966-67 organized by the Department of Field Services of the National Council of Educational Research and Training, New Delhi. It is a matter of gratification that teachers are honoured by the Governor himself, the Head of the State. To recognize the outstanding contributions of primary school teachers in education, the Government of Madras have instituted a scheme of "STATE AWARDS" and each year the awards are distributed by the Governor himself. We welcome him with great pleasure.

I am very happy to welcome Dr. Buch, Head of the Department of Field Services, NCERT, New Delhi, to this momentous function. We are thankful to Dr. Buch and the National Council of Educational Research and Training, for having selected Madras as the first State outside New Delhi to hold the National Meet.

It is a matter of great satisfaction that the National Council of Educational Research and Training has initiated this programme of Seminar Readings in order to stimulate secondary school teachers and headmasters to write about their experience and knowledge acquired through experimentation in their work and through study and creative thought about educational problems. Through the Seminar Readings, the Department of Field Services has embarked a programme which is expected to bring about the desired reconstruction in the field of teaching methods, curriculum and evaluation.

We welcome all the delegates from the several states of India, congratulate them for the awards and for their interest in educational progress. I am glad that two teachers of Madras have won the awards. We heartily welcome all the distinguished visitors to this Fifth National Meet of the Winners of Awards.

We are glad to welcome the winners of awards to a progressive State in the field of education. During the current year the Government of Madras have set apart a sum of rupees fifty-six crores out of a total State budget of Rs. 216 crores, for education, the highest so far. The number of primary schools in this State has increased from 15,303 in 1948-49 to 30,856 in 1966-67. The number of secondary schools has increased from 440 in 1947 to over 2,000 in 1964 and to 2,256 in 1966-67. Madras has always been a pioneering State in the launching of educational experiments. The organization of School Improvement Conferences, the scheme of supplying free mid-day meals to poor pupils, free supply of school uniforms, free supply of books and slates to poor pupils, organization of the Central Kitchen Project—are some of the significant schemes in the field of education in Madras State.

These schemes which seek to enlist the help and cooperation of the people for the cause of educational development have developed a keen awareness in the public. Community participation in these schemes is very valuable. The result of the schemes has been social and educational. The achievement of these pioneering movements is indeed magnificent.

Ultimately, everything depends on the teacher and his professional growth. He has to undergo a change in a healthy manner, think for himself and become a competent person to meet the challenging demands of the profession. To that extent our State Institute of Education which has organized this National Meet in Madras is doing excellent work through its varied activities, *viz.*, In-service Education, Research, Extension Work and Publication. Right now, we are glad that 200 graduate teachers of secondary schools are undergoing Refresher Courses in the elective subjects—algebra and geometry, physics, chemistry and biology—in four institutions in Madras city as organized by the State Institute of Education. They have come from all the educational districts of Madras State and I am happy they are attending this function. Therefore, Madras State is well represented to-day in this National Meet.

The Seminar Readings Programme is a good in-service programme ; it is a good self-study programme. It helps demonstration of ideas, good practices and experimentation.

I do hope that more and more teachers will participate in the Seminar Readings Programme to improve their competence in the profession.

APPENDIX II

INAUGURAL ADDRESS

Dr. M.B. Buch, Head of the Department of Field Services, NCERT

YOUR EXCELLENCY, Ladies and Gentlemen,

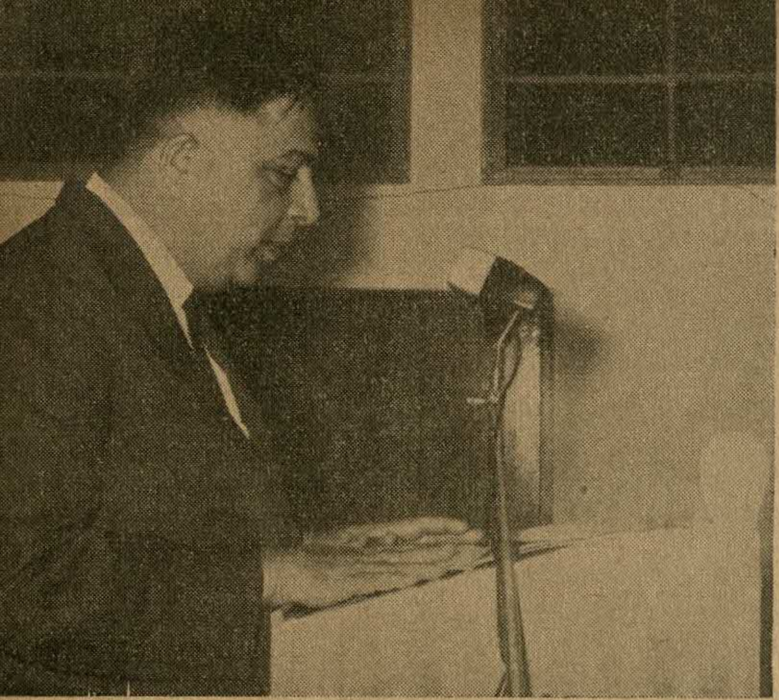
First of all let me take this opportunity of expressing my hearty thanks to his Excellency, the Governor of Madras for having agreed to grace this function and give the awards to the winners in this programme of Seminar Readings. I need not say that the teacher community in the country will consider this as a sign of recognition of the key role of the teaching profession in our attempts at improvement of schools.

I also take this opportunity of extending our thanks on behalf of the National Council of Educational Research and Training to the Government of Madras and its Education Department for readily agreeing to organize the National Meet of the recipients of awards at Madras and placing the resources of the Department at the disposal of the NCERT.

The programme of Seminar Readings was started by the NCERT during the year 1962-63. In the course of last 5 years, four National Meets of the Winners of the Awards have been organized—all at Delhi. This is the fifth programme in the series and the first programme to be held outside Delhi.

The significance of this programme can be best understood, if we are to see it in the context of rapid strides that are being taken for the qualitative improvement of education in the country. We hear a significant deal of talk these days about crises—crises in the political and economic life of the country. Problems after problems are cropping up in the country and we find ourselves entangled in numberless issues. This has its own effect on the teachers, pupils and all educational personnel. There is no question that the present day in our country and present day in education contain elements of crises, but this time is one of great opportunities in education and particularly a time of opportunity for educational workers outside and educational practitioners inside the classroom. Educational thinkers, social workers and political leaders, all are unanimous in saying that we have to look upon education to lay the foundation of a democratic society—economically strong and politically stable. For this we want good education. We want good schools for good education, we want good curriculum and good teachers—teachers who are professionally alert and educationally sound.

It was with this clear objective of bringing about the qualitative improvement in education that the NCERT was established in the year 1961. The NCERT has been entrusted with the enormous task of developing thinking in Indian education, developing expertise in various branches of education that would provide assistance and other services in the programme of educational improvement with which the whole country is seized today. During the course of last six years the NCERT has made efforts to develop a programme of research, training and field services to bring about change in Indian education.



Dr. M. B. Buch, Head of the Department of Field Services inaugurating the National Meet

Vote of thanks by Dr. H. H. S. Lawrence, Director, State Institute of Education, Madras

Two important things in a programme of school improvement are the building up of a good instructional programme and developing the curriculum material, and the programme of building up and developing the human material that would administer the programme in the classrooms. The NCERT showed that to improve our education the essential thing is to have improvement in curriculum and the curriculum material. Today the NCERT has a major programme of developing new curriculum material which could be used with adaptation by state governments.

A syllabus in social studies has been prepared and new textbooks in social studies from Class I to V are in the market. Programmes have been developed in history and geography for the middle and the secondary stages and some textbooks are also available.

New materials in sciences and mathematics have been developed. Today on a try-out basis about 35 middle schools of Delhi have introduced the new material in physics, chemistry, biology and mathematics at the middle stage and about 400 secondary schools are using the new algebra programme developed by the NCERT.

Along with improving the curriculum the NCERT is concerned with a programme of improving the examinations. The NCERT has taken up a programme of improving examinations in collaboration with a large number of state governments and Boards of secondary education. The attempt is at building up a core of persons in every state who would be helpful to the state government and the State Boards in their effort to improve the evaluation of pupils' achievement.

In the field of teacher training the NCERT has developed a programme of improving the pre-service education through its Department of Teacher Education and a programme of imparting in-service education of primary and secondary teachers through its network of about 150 Extension Services Departments established all over the country. Again, the NCERT has established four Regional Colleges of Education to develop model programmes of preparing teachers in one year course and also in a course of four-years duration.

The research programmes of NCERT are again geared to what is required for qualitative improvement of schools. Studies have been undertaken to develop evaluative criteria for inspection and supervision. Even if these tools cannot be used for routine inspection, the research has provided a more reliable instrument in the self evaluation of schools by school personnel.

If a state would like to survey the achievements of pupils in mathematics at the end of primary, middle and secondary stages and compare the achievements of its pupils with the corresponding achievements of pupils in the other states, for the first time the tools exist to such a study. The NCERT has developed a series of sequential tests of achievement in Mathematics in all Indian languages and similar tests in social studies and sciences are being developed.

I would, here, like to mention specially one research which promises to be of great value in improving pupils learning in the classroom. This is the research in the field of motivation training. The initial results of this research indicated that if teachers are trained in motivation training, the programme does result in an accelerated motivation of pupils and learning by pupils improves significantly. The experiment has given promising result in a group of schools in Rajasthan.

Now it is being tried out in a group of schools at Nagpur and preparations are afoot to repeat the same in a group of schools in Gujarat.

The NCERT on the request of the Ministry of Education, undertook the Second All India Educational Survey and the survey data are now available to the Ministry of Education and the state governments for planning purposes. On the basis of the survey data the States of Mysore, Andhra Pradesh, Maharashtra, Uttar Pradesh and Orissa have already started preparing District Educational Development Plans and it is hoped that other States will also take up this work soon.

Ladies and Gentlemen, I have mentioned here some of the significant activities of NCERT which may lead to help a programme of qualitative improvement in education. Two questions may arise : "Is any change coming?" and "What is the place of teachers in this programme?"

To the first question I can say, yes. The change is coming. One can see the edge of advancing change clearly:

(*a*) A large number of states have started a programme of improved examinations. In the north, Punjab and Rajasthan, in the south all the four states, in the west, Gujarat and Maharashtra, in the east, Bihar and Assam have started a programme of improving the examinations with the help of the expertise from the NCERT.

(*b*) Apart from Delhi, Bihar has accepted the Hindi programme of NCERT and has introduced the Hindi material developed by the NCERT throughout the State.

(*c*) In some other states new syllabi developed in social studies have been largely based on NCERT programme of social studies.

(*d*) A recent study by one of the Extension Centres in the south indicated that an appreciable percentage of teachers who have repeatedly participated in extension programmes are now trying out improved instructional techniques.

Not merely this but the over-all climate generated by the activities of the NCERT have led to the development of similar programmes by the state governments. Let us take the Extension Services Departments. Some of these departments were started as early as in 1955. The extension workers were working towards the in-service growth of teachers without any administrative or supervisory control over the schools. The job of the extension worker has been to create the climate which would lead to a programme of self improvement by teachers. The extension workers working in about 100 Extension Centres at the secondary level have been the pioneers in the task of developing a wide variety of extension programmes and laying down the basis for strong in-service education programme by the Centre at the states. Seeing the importance of this programme the Government of Rajasthan has started six additional Extension Centres of its own not financed by the NCERT. The Government of Maharashtra has taken steps in starting similar Extension Centres in additional colleges again on its own. The Government of Mysore is building up the extension programme into the structure of the new training colleges being started in the State. These are some of the indications of the changes being brought about in the field of education and the NCERT can take reasonable credit for creating the conditions of these changes.

The second issue is the place of teacher in this programme of change. It is the firm belief of NCERT, that the traditional approach of effecting change through teacher education in colleges and the supervisory leadership at the district level has now to be supplemented by a programme mounted by the teacher community. Instructional leadership has to be developed from amongst the teachers. We are far beyond the time when an occasional conference of administrators and teacher educators on a programme of school improvement is enough. Teachers must be involved in the every day tests that determine the nature and effectiveness of instruction and the NCERT is consciously trying to bring about this involvement of teachers.

In a programme of developing instructional material today in the country more than two hundred teachers are involved. Increasingly the NCERT and the Extension Services Departments are making use of competent teacher leadership in the in-service programme and other training programmes organized for educational personnel.

The NCERT has a programme of identifying good tested practices followed by classroom teachers and disseminating the same to a large number of schools.

A programme of encouraging experiments in classroom instructional techniques by teachers has been going on. Under this programme financial and academic assistance is given to those teachers who want to take up experiments in classrooms to improve instructional practices and make worthwhile experiments in the field of curriculum development in school organization, etc. Every year more than 200 teachers have been taking advantage of this scheme.

In spite of these activities, the basic issue remains—the issue of providing incentive to teachers. What incentives do we offer to teachers for trying out new ideas, new practices?

The programme of Seminar Readings has been specially designed to provide an answer to this question to a certain extent. The programme is aimed at stimulating serious thinking amongst teachers and making the result of this thinking available to the teaching profession. This is the significance of this programme.

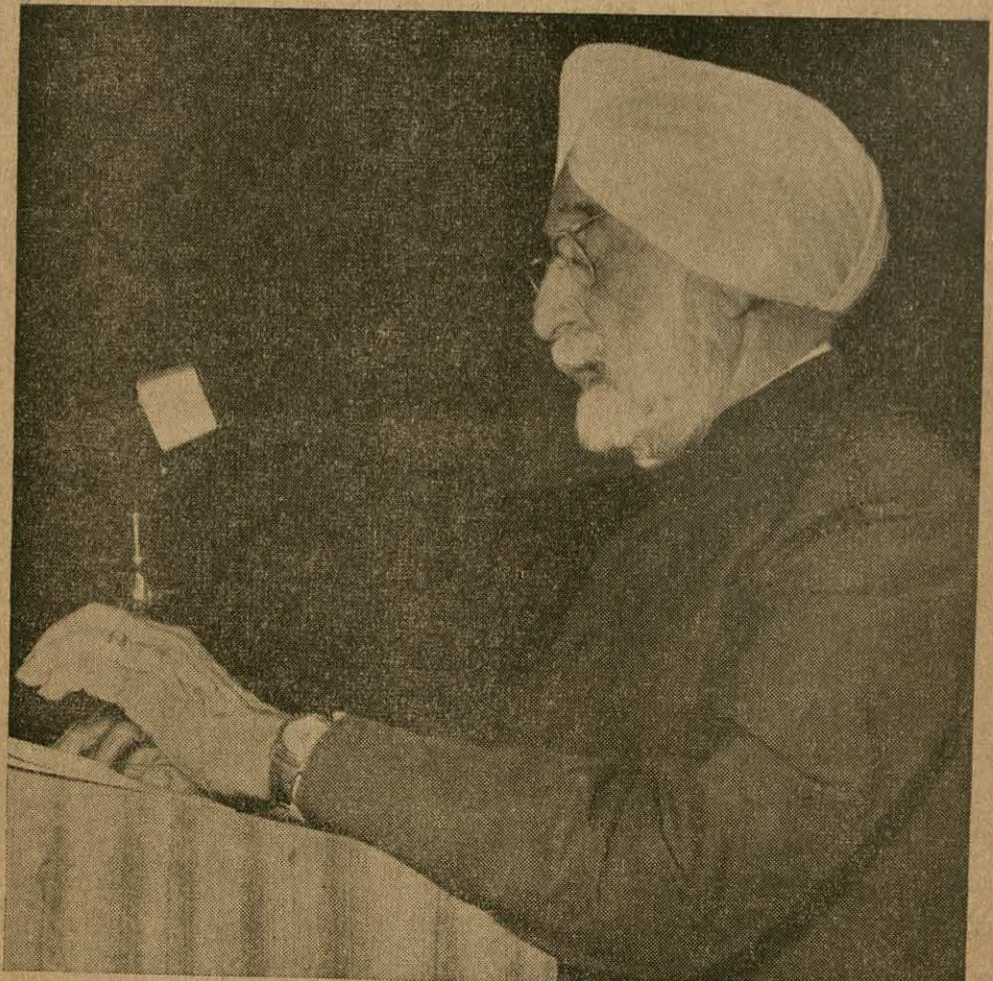
Under this programme, teachers are called upon to write essays on significant educational problems based on their own experience in the classroom. The teachers submit their essays to the nearest Extension Centre. The Extension Centre scrutinizes the essays and selects the ten best for the State Level Competition. At the state level the essays received from different Extension Centres are examined by competent authorities and first ten essays are submitted for the National Competition. In the NCERT each essay is being examined by two subject experts. This is the first round. As a result of this first examination about 60 to 70 essays are selected. These 60 essays are examined by a panel of three examiners selected from the country. The first 30 essays are declared as the winner of the awards in this programme. In the first National Meet in the year 1964, we had received 94 essays from all over the country. The number has gone to more than 130 now. This year 137 essays were received from the states. More than 1,500 teachers participated at the level of Extension Centres. The essays were screened by a panel consisting of Miss Panandikar, Mr. V.V. John and Dr. Taneja. The selected essays are published by the NCERT in the form of a book entitled *The Teacher Speaks*. This publication is distributed freely to a large number of schools in the country.

The NCERT selected Madras as the venue for the Fifth National Meet. A question may arise why Madras? Madras has given a large number of educationists to the country. It was a teacher from Madras who laid the foundation for this network of extension service in the country in the year 1965. Again a teacher from Madras began thinking in active terms for the educational technology namely Programmed Learning in the year 1966. Madras has given strong professional associations of teachers. It is, therefore, in the fitness of things that NCERT selected Madras as the first place outside Delhi for this National Meet.

In the improvement of education, teachers at every level must wake up fast. Further issue is who will succeed if the teacher will fail. If the teacher fails, not only he fails, but education itself may fail. Education has to change fast and today it must have the support and involvement of teacher community, the teacher profession. In this Fifth National Meet, I am happy to note that in Madras all the professional organizations have been involved.

Before I conclude, let me once more express on behalf of the NCERT my hearty thanks to His Excellency, the Governor and the Education Department of the Madras State.

His Excellency, the Governor of Madras, presenting the award to one of the National Awardees



His Excellency, the Governor of Madras,
delivering the valedictory address

APPENDIX III

VALEDICTORY ADDRESS

His Excellency Sardar Ujjal Singh, Governor of Madras

FRIENDS,

It gives me great pleasure to associate myself with the Fifth National Meet of the Winners of Awards of Seminar Readings 1966-67. I must, at the outset, offer my congratulations to the 30 secondary school headmasters and teachers from all over India who are winners of the awards.

I am glad that the Seminar Readings Programme is conducted every year since 1963 by the Department of Field Services, NCERT, New Delhi. It is a matter for particular satisfaction that Madras has been chosen the venue for this meet. I understand that this is the first time it is held outside Delhi.

As you all know, teachers and headmasters, among educational workers in general, have an important contribution to make in the matter of understanding and clarifying various issues connected with education. It is with a view to utilize properly their experience and knowledge that a programme of Seminar Readings has been initiated by the Department of Field Services in co-operation with State Departments of Education and the Departments of Extension Services in Secondary Training Colleges.

The objects of the Seminar Readings are indeed praiseworthy in as much as they stimulate teachers and headmasters to write about the experience they have gained and the knowledge they have acquired through experimentation in their work and through constant and careful study of educational problems. These Seminar Readings also provide a means through which the results of their own experiences and creative thinking by teachers and headmatsers can be presented to other people for discussion and be made widely known among educators in general.

The exhibition which I had the pleasure of opening is also welcome as the activities, publications and programmes of the Extension Centres, the National Council of Educational Research and Training and the S.I.E. are depicted there. I find that an effort has been made to include in this exhibition proto-types of the less expensive science laboratory equipment developed by the Central Science Workshop of the NIE.

The teacher has a noble part to play in the life of the community and in preparing the young children to be worthy citizens of this great Republic. He is, in a way, the trustee of the children who are placed in his charge for their education and development of latent talents and faculties in an atmosphere of love and affection. The profession is considered to be very noble and held sacred from ancient times. The teacher's position and status in society have to be recognized and it has been our tradition to treat the teacher with veneration.

The dignity of the teaching profession must be realized by all, particularly by the youth of to-day. It is not correct to imagine that there is no other professional education except medicine and engineering and that a man has to choose only between these two professions. There are other honourable professions like law and teaching. We find there are professions which lack votaries and there are places which still badly need educated young men and women. One such is teaching which still does not attract the best among the educated youth. I do hope that in course of time young men and women all will take to teaching and elevate the profession itself to greater heights.

A teacher has his own important place in society and also public life. We in India know that our erstwhile President, Dr. Radhakrishnan, and our present President Dr. Zakir Husain, are renowned teachers first. This, in itself, is a tribute to the teaching profession. At the same time, we have to remember that for a teacher to enjoy his respectable status in society, he has also to see that he does not remain stagnant where he is. In a way, as in fact, all of us should be—he should consider himself a student all his life. Professionally he should grow and keep himself abreast of the times. A teacher may be an expert in the subject of his teaching but he must also be well versed in individual and group psychology and in the science and art of education. A view has been rightly expressed that teachers who have been teaching for some time do not feel the necessity for in-service growth as members of other professions do in order to acquire up-to-date knowledge of new developments in their profession. This point has to be particularly stressed in view of the tremendous advance made by science, technelogy and all other branches of knowledge as a result of continuous research work done all over the world. There is need to have refresher courses for teachers. Rabindranath Tagore, who besides being a great poet, was also an eminent teacher, pointed out :

> "A lamp can never light another lamp
> unless it continues to burn its own flame ;
> A teacher can never truly teach unless
> he is still learning in himself".

Another point which the teacher has always to bear in mind is that a child learns more by example than by word of mouth. Character building is a most important function of education. And in this matter the behaviour and conduct of a teacher have a direct impact on the minds of his pupils. Education must be purposeful and aimed at the development of an integrated personality, intellectual, emotional and moral.

In this connection, the functioning of the S.I.E. is helpful. Improvement of teacher education is an important responsibility of the Institute. There has been unprecedented expansion of education facilities at all stages. With this, increased opportunities have also been provided for training of teachers. When we have quantitative improved expansion in education, we must also see to it that qualitative improvement is invariably gained in our schools. I do hope that the State Institutes will work with devotion in this direction.

Since independence, the governments both at the Centre and in the states have done much to improve the lot of teachers. The institution of awards of Seminar Readings is also a step calculated to enable the teaching profession and encourage its members to put forth their creative thoughts and latent talents in the cause of society and the nation.

APPENDIX IV

VOTE OF THANKS

Dr. H. S. S. Lawrence
Director, State Institute of Education, Madras

IT GIVES ME great pleasure to thank His Excellency the Governor of Madras for giving the valedictory address on the Fifth National Meet of the Winners of Awards of the Seminar Reading Programme and distributing the Awards. His presence in our midst and his address are a tribute to the teachers of India. By distributing the National Awards and opening the exhibition, His Excellency has shown that the teaching profession in our country deserves to be recognized and rewarded and provided with proper incentives and encouragement. Every year in our own State, His Excellency distributes State Awards to Primary School Teachers which shows his great interest in the welfare of teachers. The Japanese member of the Education Commission was once asked : "What is the professional hierarchy of public regard in your country"? He answered : "The first position is to the Emperor and next to him is the School Teacher and all others come afterwards". His Excellency, the Governor today has demonstrated the need for such high regard, attention and status for teachers in our country.

In his address, His Excellency has clearly given expression to the noble part that teachers are playing as the trustees of our children. The profession, His Excellency said is considered to be very noble and held sacred from ancient times. His Excellency pointed out how Dr. Radhakrishnan and our present President Dr. Zakir Husain are renowned teachers first. One important point emphasized by His Excellency is that a teacher should not be stagnant but should consider himself a student all his life. His Excellency himself borrowed a few books on Adult Education from the library today and hence His Excellency is a student all his life. It was good His Excellency quoted the famous words of Rabindranath Tagore :

> "A lamp can never light another lamp
> Unless it continues to burn its own flame ;
> A teacher can never truly teach
> Unless he is still learning in himself."

We thank His Excellency wholeheartedly for his participation in the National Meet and for inviting the winners to Raj Bhavan tomorrow for a reception.

But for the efforts of the Director of School Education this National Meet would not have been possible in Madras. The National Meet has been planned and organized by him. For the first time the National Meet is held outside Delhi in our State and our Director deserves credit for this. He is one who is actively interested in the promotion of Teacher Education and Teacher Welfare and in the quality of teaching and learning, having been associated with the work of the Education Commission at Delhi. We are thankful to him for his leadership and guidance.

The brain behind the National Meet at Madras is Dr. Buch, Head of the Department of Field Services, NCERT, New Delhi.

It was he who wanted the National Meet to go out of the Nation's capital and to Madras. We appreciate his attitude and thank him for permitting it. Dr. Buch is a distinguished educationist. He recently directed the Second All India Educational Survey successfully. He has been a great help in the organization of this National Meet and Exhibition and was with us these two days looking into every detail. We are deeply thankful to him and to his able assistants Mrs. Duggal and Mr. Iyer.

We are grateful to Dr. Shib K. Mitra, our able and energetic Joint Director and Mr. P.N. Natu, Secretary of the NCERT for their excellent cooperation. The NCERT is doing excellent work in the pursuit of qualitative education and deserves every credit for such pioneering work.

The Seminar Readings Programme is a programme of cooperation at so many levels—teachers, extension services, education departments and NCERT. We thank all the teachers who contributed essays, to all who assessed them and to the winners who have come from all over India. We are thankful to them for coming over to Madras and we wish them a good time in Madras.

I have great pleasure in thanking the six chairmen of the groups which discussed the various papers—Mr. Titus and Mr. Chittibabu, Joint Directors of School Education, Mr. Natarajan, South India Teachers' Union, Mrs. Hoon, Principal, Central School and Miss Vedanayagam, Coordinator, St. Christopher's Training College. I thank also the various consultants of each group.

In the organization of this National Meet many people have given their very best. I thank the staff of the State Institute of Education, Inspecting Officers of Madras, the South India Teachers' Union, the Chairman, Secretary and Staff of the District Central Library, the Extension Services of Meston Training College and St. Christopher's Training College and the Gandhinagar Education Society for their help and cooperation. Finally, I thank you all for your presence, specially the distinguished educationists of Madras. I am glad that 200 teachers from all the districts of Madras undergoing the Refresher Course in the elective subjects organized by the State Institute of Education are attending this function. Thus, teachers of Madras State are well represented.

In conclusion, I would like to say that what lies behind this programme is important. The programme of Seminar Readings is a programme which gives honour not to individuals only but to the teaching profession as a whole. This is a programme which enriches educational thought and practice and encourages practising teachers to give thought to techniques of teaching and learning. The Seminar Readings Programme contributes to the competence of teachers. The programme is a programme of discussion and dissemination of good practices. It contributes to educational planning too. The teacher speaks through this programme and hence it is an excellent programme. May it continue for years to come! Thank you one and all.

APPENDIX V

ALL INDIA COMPETITION OF SEMINAR READINGS

List of National Awardees 1966-67

Category 'A'

1. Shri D.S. Luktuke,
   Maharashtra Vidyalaya,
   1786, Sadashiv Peth,
   POONA-2 (Maharashtra).
2. Shri P.V. Jagannadha Rao,
   Lecturer,
   Municipal M.P. Higher
   Secondary School,
   DHAMTARI (M.P.)
3. Smt. Nirmala Gopal Kirane,
   Shri Dayanand Balika
   Vidyalaya, Matunga,
   BOMBAY-19 (Maharashtra).
4. Shri K. Venkataramaiah,
   Sree Siddhaganga High School,
   TUMKUR (Mysore).
5. Shri K.M. Sripada Rao,
   Assistant Master,
   Govt. Central High School,
   BANGALORE-2 (Mysore).
6. Shri H.A. Trivedi,
   Diwan Ballubhai Madhyamik Shala,
   KANKARIA, Ahmedabad (Gujarat).
7. Shri A.P. Oza,
   Karansinhji High School,
   RAJKOT (Gujarat).
8. Shri Choithram P. Sadhwani,
   Teacher,
   M.P.H.S. School,
   Banasthali Vidyapeeth,
   BANASTHALI (Rajasthan).
9. Dr. Dayal Saran Verma,
   Asstt. Master (Logic),
   Queen College,
   VARANASI (U.P.).
10. Shri C. Padmanabhan,
    Headmaster,
    Sri Ramaswamy Mudaliar
    High School,
    Ambattur, MADRAS-53.

Category 'B'

11. Shri Sohan Lal Patni,
    Headmaster,
    Parshwanath Umed Secondary School,
    FALNA (Pali),
    Rajasthan.
12. Miss G.R. Shanthappa,
    Convent of Jesus and Mary,
    Civil Lines,
    AGRA (U.P.)
13. Shri P.G. Vaidya,
    Principal,
    Vidya Mahamandal Prashala,
    POONA-4 (Maharashtra).
14. Shri R. Ramakrishnan,
    Shri Ramakrishna Math,
    MADRAS-4.
15. Shri P.M. Ravindran,
    Graduate Assistant,
    Govt. Higher Secondary School,
    Kavara Hills Land,
    Union Territory of Laccadives,
    Via S. P.O. CALICUT.
16. Shri N.G. Thakker,
    J.N. Balika Vidyalaya,
    Saraspur, AHMEDABAD,
    (Gujarat).

17. Shri D.C. Jain,
Principal,
Ahmadia Hanafia
Intermediate College,
AGRA (U.P.).

18. Shri S.K. Roy,
Principal,
Central School No. 2,
AGRA (U.P.).

19. Shri S. Ramanujam,
Teacher in Commerce,
Demonstration M.P. High School,
Regional College of Education,
MYSORE.

20. Shri Harendranath Sarma,
Principal,
Patacharkuchi Vidyapith,
P.O. Patacharkuchi,
Distt. KAMRUP (Assam)

Category 'C'

21. Shri B.N. Kaul,
Principal,
Gujaranwala Higher Secondary
School,
Ram Bagh Road,
DELHI.

22. Miss Indra Shipley,
Lecturer,
Municipal Girls' Inter College,
Kashmiri Mohalla,
LUCKNOW (U.P.).

23. Shri N.K. Jha,
Principal,
T.J.B. Collegiate School,
BHAGALPUR (Bihar).

24. Shri Keshil Mal Jain,
Teacher,
Vidya Bhawan Higher Secondary
School,
UDAIPUR (Rajasthan).

25. Shri P.S. Joshi,
New English School,
Ramanbaug, POONA-2,
(Maharashtra).

26. Smt. Gopa Roy,
Headmistress,
Chetla Girls' Higher Secondary School,
Alipore, P.O. 60/C Jaynuddi,
Mistro-Lane,
CALCUTTA-27 (W.B.)

27. Shri Kali Kinker Mukherjee,
Headmaster,
L.E.B.B. High School,
RANCHI (Bihar).

28. Shri C.P. Patel,
Sh. Vividhal-Koshi Vidyamandir,
P.O. PALAMPUR (Gujarat).

29. Shri Bholanath Moharana,
Assistant Teacher,
Kendrapara High School,
KENDRAPARA,
Cuttack (Orissa).

30. Smt. Sudha Sinha,
Headmistress,
Govt. Girls' Higher Secondary School,
BHAGALPUR (Bihar).